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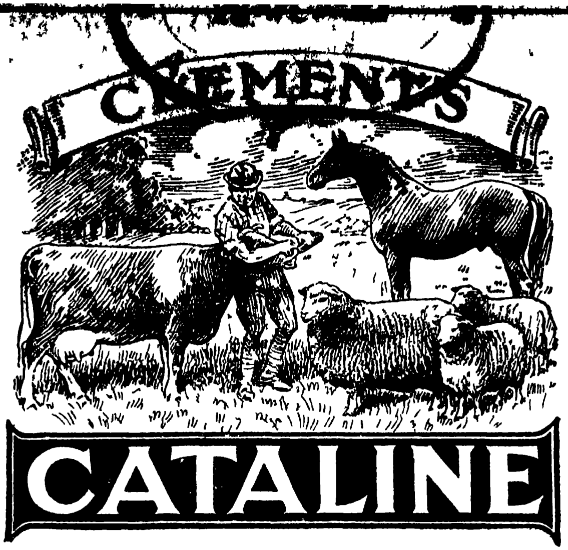

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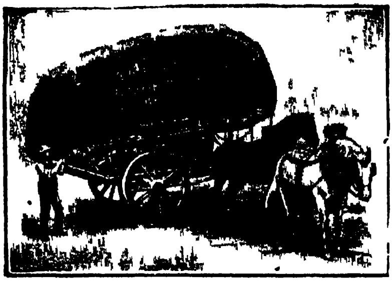

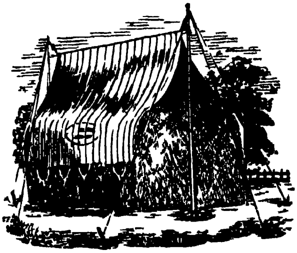

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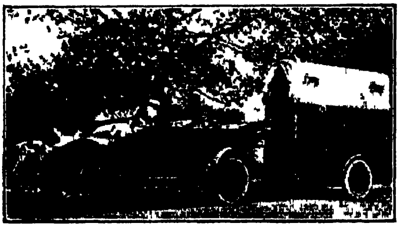

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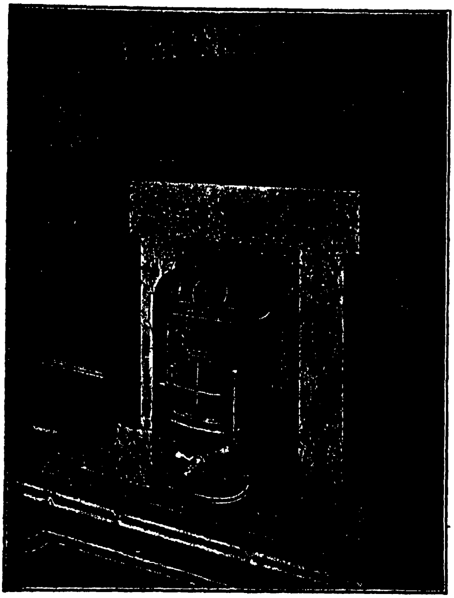

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OBITUARY NOTE.

While going to press we learn with the greatest regret of the death of Mr. Charles Lund Fry Edwards, a trustee and vice-president of the Society, and for more than 30 years a steward taking an active part in the Show Yard. It is unfortunately too late to give any detailed account of the services he has rendered to the Society, or of the many kindly qualities which secured for him the affectionate regard of his colleagues, by whom he will always be held in grateful remembrance.

JOURNAL
OF THE
BATH AND WEST AND SOUTHERN COUNTIES
SOCIETY.

Original Articles and Reports.

I.—ESTATE FOREST POLICY.

By A. D. C. Le Sueur.

A very prominent point emphasized by the war is the ever-increasing importance of wood as a raw material. As industry and population grow, the consumption of timber rises higher and higher, and in this country has increased from 3·5 to 10·5 cubic feet per head in the last 50 years. Whilst certain uses die out, more new ones are found, while it is doubtful whether any substitute capable of being obtained more cheaply, quickly, and in great bulk, will ever be forthcoming.

Another lesson teaches that the day of heavy timber, such as oak, is definitely gone. Civilization advances so quickly to-day that durability is at a discount, and iron and concrete are used where great strength is required. The timber now in demand must be fairly strong, easy to work, and elastic. Coppice, especially hazel, is useless, coal taking the place of faggots and wire that of fencing material. Owners who imagine that " the day of hazel and mixed coppice will come again " are making a great mistake, and will do well to change such an obsolete method of sylviculture before they lose more money.

Landowners must now realize that it is useless to carry on the haphazard methods so common in pre-war days. A definite policy and objective are absolutely necessary, even though confined to natural regeneration, or the spending of only a little money towards improvement. Such a policy may save money even when none is actually made. It is essential when planting to remember that "the tree to plant is not the one that grows best, but the best one to grow." If this is always acted upon it will be a long step towards financial success.

Arising out of these statements, much more interest should be taken in questions of forestry education. No scheme can be carried out with hope of success unless the owner or his agent has a thorough up-to-date knowledge of forest practice. The custom of leaving complete management of the woodlands to the forester is strongly to be condemned. No forester or woodman is capable of controlling a scheme of any size in its entirety. There are many essential factors to be taken into consideration besides successful planting and felling.

But by far the most important point to be dealt with is the fact that English estate forestry is just as important as state forestry, in spite of all that may be stated to the contrary. In a small country such as England, land near towns is, as a rule, far too valuable to be taken up in large blocks suitable for state forests. These must, therefore, of necessity, be established in comparatively remote places usually badly served by road and rail. In the case of war, or other national emergency, the traffic system in such regions would be unable to cope with enormous quantities of a bulky material such as timber, and all outlets would be blocked up rapidly. Estate woodlands, on the other hand, are scattered all over the country in small blocks, which are easy to handle, and frequently close to industrial areas. From these the problem of distribution is, at all times, comparatively simple. The success of state forests in remote regions depends entirely on the possession of cheap and easily obtained transport, such as we do not possess in this country. If Canada, Scandinavia and Central Europe did not possess this in the shape of river facilities, they would not be the successful lumber countries they are to-day.

In these circumstances, the fact that we now have a definite state forestry system should not be considered a sufficient reason for an estate woodland owner to sit down and fold his hands. Estate forestry has been, is, and still will be, a highly important national asset and every encouragement must be given to it:

GENERAL POLICY.

The appointment of the Forestry Commission has enabled the estate owner to take up an entirely different standpoint compared to that of pre-war days. State forests must be composed of comparatively large areas. They are not troubled with such questions as amenities, game, or death duties. They can work at a lower rate of interest than those of a private owner, and there is a definite continuity of treatment quite impossible on land in private ownership. This enables them to take up the cultivation of oak, beech, and other species needing long rotations. Estate areas are usually small. Sylvicultural schemes are dovetailed into those connected with agriculture. Labour on one can be utilized for the other. A higher rate of interest is required and money must be more frequently handled. Easily managed quick growing crops on short rotations are therefore indicated, and those requiring long rotations should be left entirely to the State to produce.

THE ESTATE SCHEME.

The woodlands on an average estate will be found to fall roughly into the following three classes or groups : --

(1) Amenity or demesne.
(2) Outlying.
(3) Woodlands proper.

I.—Amenity Woodlands.– Amenity woodlands are a characteristic part of British estates. They have two important values besides that of the timber itself : (*a*) Shelter ; (*b*) Sport. The latter is highly important, and, in fact, in some cases all-important. There are estates on the poor sands of Norfolk, the woodlands of which are let for sporting purposes at 10s. per acre. Good shooting is often the deciding factor in cases of letting or sale. There is no reason whatever why forestry and game preserving should not be carried out successfully on the same estate. It is chiefly a question of tactful management, and this is rendered much easier by working the woodland on a definite policy. The gamekeeper can then be kept fully informed of what operations are taking place, for a considerable time ahead, and can arrange accordingly.

The quantity of woodland to be scheduled with the mansion under the heading of " demesne woods " will, of course, vary with the size of the estate and the value of the sporting rights, but on an estate of any considerable extent, all woodland within a radius of half a mile from the mansion should be included.

For such woodland a separate scheme should be drawn up, as it would be undesirable to manage it on purely commercial lines. Existing woodlands, especially those consisting of broadleaved trees, should be dealt with under a modified selection system. When new areas are being planted up, they should be so arranged that sections on being clear felled should leave no unsightly gaps visible from the mansion or its near vicinity.

II.—Outlying Woods.—These should be treated in as simple, practical and economical a manner as possible. They are (1) frequently difficult of access; (2) usually small in size; and (3) owing to the fact that they have often been planted merely as windbreaks or screens, are of awkward shapes, rendering fencing a serious and expensive matter. (4) The timber is as a rule of comparatively poor quality, and costly to handle. (5) The question of estate sales must be considered. It is more or less the invariable rule that the outlying portions are sold off before the main estate is touched, and in this case, such woodland areas seldom if ever realise a price that would warrant considerable expenditure beforehand. Outlying woodlands should therefore be managed with a minimum of expenditure. In order to keep them in as productive a form as possible every effort should be made to encourage natural regeneration.

Damage from rabbits is as a rule not nearly so great in woodlands undergoing natural regeneration, as in plantations established by artificial means. Only those species which are not approved of by rabbits as an article of diet should be encouraged. The necessity of putting up netting will then be eliminated, and this in itself will be a very great factor towards financial success. Sycamore will thrive in these circumstances, especially if there is any chalk in the soil. It is for a hard wood, a fast growing type, and when of marketable size is most valuable. Self sown sycamore is practically immune to rabbit attack, unless the latter actually starving, and can frequently be seen actually growing in warrens. Birch might be encouraged, and last, but certainly not least, ash.

Besides the owner of large agricultural and woodland estates there is another class to whom these remarks are directed, namely the owner farmer.

Owing to the breaking up of many of the great estates, there are now many farmers who are the possibly unwilling owners of woodland, sold to them with their farms. Instead of regarding these spinneys and coverts as useless encumbrances, every effort should be made to improve production on the lines mentioned. With very little trouble and a minimum of expenditure they can quite easily be improved. Besides acting as a wind screen and shelter for stock these small areas could be made to supply much valuable fencing material, which once freely obtainable from the landlord, must now be purchased in the open market. In the United States the "woodlot" is considered an important integral part of the farm and every assistance is given by the forestry authorities towards its betterment.

III.—Sylvicultural Woods.—These woods should be managed on strictly commercial lines, as follows :—

(1) A census of timber should be prepared and filed in the estate office for easy reference and for deciding questions of policy. It is not difficult to prepare, and consists of a summary of the timber on the estate showing the number of trees, variety and contents.

The following is a rough example of the form recommended :

CENSUS OF HIGH FOREST TIMBER.

Ord. No.	*Name of Wood.*	*Area.*	*Total trees.*	*Cub. ft. per ac.*	*Average tree c ft.*
		Oak.			
201	Beverley Springs	21.00	231	13 545	59
211	Sandholes	6.00	43	986	23
271	Broxup	8.50	706	11.994	17
			980	26.525	27
		Larch.			
3	Dog Kennel	9.00	36	720	20
8	Castle Hill	8 00	2	92	46
			38	812	21

SUMMARY OF HIGH FOREST TIMBER.

Species.	*No. of Trees.*	*Total c.ft.*	*Average tree. c. ft.*	*Remarks.*
Oak	980	26,525	27	
Larch	38	812	21	
	1,018	27,337		

The advantage of possessing information such as the above is obvious. It is possible to see at a glance the amount of timber of each species on the different areas. The possibility of satisfying a particular demand can be ascertained at once, and an approximate idea of the financial returns estimated. To take a concrete example. If heavy oak timber is required, one look at the census would show that Ord. Area No. 201 would be the only area where this could be found, and no time is wasted in scouring the estate.

Measurements are approximate only, as this is all that is necessary for the purpose of deciding points of policy. Detailed measurements necessary for actual sale are better taken after it has been decided what is actually to be sold in any particular year.

2.—The standing timber should be classified according to species and size to meet the requirements of the market, and particularly with a view to selling what is in best demand, and attaining the best results.

3.—A three years' felling and re-planting programme should be decided upon with a view to its developing into a permanent working scheme. Of the receipts obtained from sales, a definite proportion should be included in the estate income. A further proportion should be retained for the purpose of re-planting a definite area annually, for establishing a saw mill or for other special requirements.

4.—The woodland areas should be classified into "economic" and "uneconomic," separating high forest and coppice areas from one another, and making arrangements to deal with a certain proportion of each in the year.

5.—The sale of timber should be carefully organized and considered. The best methods for obtaining young plants should be foreseen, and all details dovetailed into a well thought out and definite annual programme.

6.—In view of the high rates and taxes it is necessary carefully to investigate all assessments of woodlands and matters relating thereto. Money may often be saved in the payment of rates and taxes, by seeing that assessments are placed on a reasonable and proper basis, and by having conclusive evidence as to expenditure necessary for managing on commercial lines. .

7. Investigate carefully the effects of the war and high wages on the marketing of timber, and the receipts and expenditure from woodlands. Increased cost of labour, road transport, and particularly railway rates may alter the whole policy or management of some types of woodland. Much inferior oak and other timber situate in remote districts is unsaleable at present except for a comparatively limited local demand. This will necessitate estate conversion either by portable mills, or cleaving *in situ*, and special steps to develop local markets for the sale of the converted material. The increased cost of transplants, and other items necessary for re-establishment, will need careful consideration. The present high price of wire netting will doubtless be reduced, but most items of expenditure will remain at a higher level than those ruling before the war.

8.—The question of an estate nursery must be gone into carefully. On estates carrying much woodland, and planting each year, it is a necessity, but can be dispensed with on small estates, especially those where there is no skilled forester. The successful carrying on of a nursery is dependent upon a definite woodland policy, otherwise much material becomes overgrown and worthless. Small estates without a regular nursery should, if planting every year, obtain seedlings and grow them on till they are of planting size. Larch 1 year, seedlings cost to-day 5s. per 1,000 against 45s. per 1,000 at 3 years old.

SPECIES FOR PLANTING.

The demand for timber has undergone considerable change in the last 50 years. The day for oak has gone and whilst young well-grown specimens should be encouraged it is undesirable to plant this species for the following reasons :—

(1) It needs a long rotation of at least 120 years.
(2) It is hard to work.
(3) The demand is irregular for large quantities.
(4) There is a large and constantly increasing competition from America, Japan, and the Continent.
(5) Its chief market—railway work—has been prejudiced by the more easily worked American oak.
(6) The increased use of creosote has brought cheaper timbers into competition.

Reasons against the planting of Beech are :—

(1) Long rotation, 100 years at least.
(2) The demand is local.
(3) Thinnings and poles are of no value.
(4) It is more liable to damage by rabbits than any other species.

Spruce.

(1) Must be grown in large quantities otherwise overhead charges are high.
(2) Must be grown close. Planting is therefore expensive.
(3) The price obtained is very low.
(4) Foreign competition is very strong.

As regards the actual species which can be planted with hope of financial success in estate woodlands, they should as far as possible have the following qualifications :—

(1) Rapid growth and early maturity enabling the money invested to be turned over as quickly as possible.
(2) Easy working. This is especially important at a period when machinery is largely used.
(3) Lightness and elasticity.
(4) Saleability in small lots.
(5) Easily managed.
(6) Not liable to disease or insect pests.
(7) Valuable thinnings. Steady annual receipts from thinnings of all ages are an important asset in estate forestry.
(8) Uses must be many and varied.

The Poplar.—The planting of this tree has been advocated by authorities for many years, and the chief reason that it has not been planted more extensively is the want of knowledge regarding its possibilities, and the fact of its low price. The latter is chiefly because the supply is limited to the occasional marketing of small lots. Given steady supplies a good price will be obtained.

To consider for a moment its special properties:

(1) It is one of the lightest of timbers and therefore valuable in many purposes for which a light timber is required.

(2) It is the least inflammable of all wood, as can be judged by the fact that it is the only timber suitable for smoothing out the molten material in glass works. Owing to this property it is always to be found where timber is exposed to friction, and is, therefore, in demand for the large brake blocks used in conjunction with the pit head winding gear of the Midland collieries.

(3) Owing to its tough and "woolly" construction it is particularly adapted to rough usage, as it dents without splintering. This makes it a desirable timber to use for boxes and crates, or any other type of article that has to be handled to any extent. It holds nails well, and the timber is tasteless and without odour, being therefore largely used for butter boxes and dairy utensils. The fact that French sabots and Dutch clogs are made from poplar wood is a standing testimonial to its toughness and powers of wear.

USES OF POPLAR

Classified under Trades and Compiled from Authoritative Sources, including Witnesses before Royal Commissions.

Trade.	*Uses.*
Aeroplane-Maker	Parts of aeroplane (Elwes).
Builder	Floor-boards; rafters and small beams; studs, under-pinning for flooring; laths; joinery; large barn doors; partitions in stables; light roofing; spars; shingles; rounds of ladders; lining, sarking (Maw); floors of hop casts (Maw).
Bootmaker	Heels, clogs; sabots in France, wooden shoes in Holland.
Box-maker	Small boxes for fancy goods, etc., cut like veneers; cigar-boxes.
Cabinet-Maker	Veneer backing; interior cabinet work.
Carriage, Cart and Wagon Maker. Wheelwright	Linings; bottoms and sides of carts and wagons; brake-blocks; carriage-panels.
Carver	Wood-carving; substitute for lime wood.
Case-maker	Packing-boxes and cases; light cases for butter and eggs; fish-boxes; butter bones.
Collieries	Tram boards, brake-blocks (pit head gear).

COOPER	Herring casks; milk pails; riddle-rims; bars and pins for cask bottoms.
GLASS-WORKS	Smoothing molten glass (special use).
MATCH MANUFACTURER	Matches; match-boxes.
RAILWAY	Wagons; brake-blocks; barrows; lagging; engine boilers.
TURNER	Turnery generally; bobbins; reels for thread.
WOODWARE MANUFACTURER	Butcher's trays; hogs' troughs; pack-saddles; rollers for wrapping silk; malt shovels; wooden dishes.
SUNDRY	Skillets; splints; sheaths for swords or knives; plaited wooden baskets; rails; fascines; poles; tree or vine stakes; slips for cargo; papier-maché; wood pulp; inferior pencils; toys; plasterers' tools; coffin bottoms; polo balls; tennis racket presses.

When these facts are fully appreciated the production of poplar on a large scale will inevitably follow. In France it is considered extremely valuable, and is in great demand, especially for toys and packing cases. So much is this the case, that the supply is unequal to the demand, and the French Government has of late been seriously considering the question of forbidding the export of the timber to other countries.

Further important points dealing with the production of poplar and the advantages to be gained thereby are :—

(1) Owing to its light demanding requirements poplar needs ample room and should never be crowded in close forest. In fact, so great is the need for light that it even sheds branches in order that the remainder of the tree may have a minimum of shade. Trees should, therefore, be planted 20 feet apart, which represents about 109 to the acre. Even 50 trees can be planted per acre at 30 feet apart. Poplar and willow are the two trees which should be grown in open order, and as single trees, and are, therefore, most suitable for spinnies or hedgerows.

(2) Owing to its very rapid growth, and early maturity, the timber can be grown on short rotations, and felled at, or before 50 years of age. Even at 35 years selected varieties of poplar show a large return.

(3) Owing to the suitability of the tree for planting singly in open spaces in woods only the single trees themselves need protection from animals, and it offers exceptional advantages with reference to our greatest forestry enemy—the rabbit.

A small sleeve of wire netting at an approximate present-day price of 2d. can be placed around each tree, and therefore even when planting the maximum number of 109 to the acre, this represents a cost of 33s. 4d., compared to the £14 necessary to surround a single acre with ordinary rabbit netting. Poplar is grown very largely by the peasants and communes of France, and in view of the cutting up of many large estates its possibilities should appeal largely to the new farmer-owner.

The Ash.—This tree is saleable at all ages from the size of a walking-stick upwards. It is light, strong, tough, and when young extremely elastic, properties which rendered it highly suitable for aeroplane work during the war.

It is at its best grown singly, or in small groups amongst larch and sweet chestnut, the latter of which can be coppiced, if seen fit to do so. It also does well in conjunction with beech in places where chestnut will not thrive. Ash is a naturally fast-growing tree, and this quick growth must be encouraged in order to obtain wide annual rings, these giving weight and consequent strength. Elasticity is one of its most valuable properties, and this is at its greatest during youth, decreasing rapidly with age. Ash should, therefore, be confined to short rotations from 40 to 60 years.

A very lucrative market for comparatively young ash is the sports trade—tennis racquets and hockey sticks, etc. For really good ash, suitable for this purpose, anything up to 6s. per c. foot may be obtained.

A rough guide to the type of tree required is as follows :—

Type.—Plantation grown.

Age.—40 to 60 years.

Diameter.—8—15 inches mean quarter girth.

Bark.—Fine, smooth, light-coloured, free from fissures.

Appearance of Trunk.—Branch—free up to 12 feet from ground level, clean and free from disease. Should not bulge at base.

With comparatively small butts of this type, the high price obtainable makes the distance from the manufacturer of little importance.

Small Ash is also largely used in the Midlands for tool handles, from 5 inches Q.G. upwards.

It is the chief timber used in the motor trade for coach-building. The bodies of the London General omnibuses are practically entirely constructed of ash.

There are multitudinous other uses these including :—

Wheel wrighting
Sieve rims
Furniture
Agricultural implements
Hurdles
Aeroplane work
Boat Building
Gymnastic apparatus
Hoops
Fencing, etc., etc.

The Sweet Chestnut.—A fairly fast growing tree, and suitable as a substitute for oak. Liable to shake when old, and therefore must be grown on short rotation of about 60 years. First quality timber is generally found in pure plantations. Apt to be coarse when grown in mixtures. Thinnings, valuable at all ages. Chestnut coppice is one of the most valuable forest crops of the day. £50 per acre is sometimes realised for 12-year coppice.

The timber is nearly all heartwood, easy to work and has excellent finish. It is in good demand for furniture and coffin-making. It makes excellent posts, and rail fencing, being hard, strong and very durable.

The Larch.—If an estate is situated near coalfields, larch should be planted, as it is the only type of home-grown timber that will sell for pitwood at all times. The trees do well on deep well drained rocky soils, but are not suited to stiff clays and frosty situations. They require more space than other conifers. Over-crowding is asking for disaster as larch drawn up rapidly with little or no " top " will never make good timber. Pure plantations are not to be recommended owing to its liability to disease, and it does far better when grown in a mixture with ash and sweet chestnut, or with beech on soils where chestnut is unsatisfactory. The timber is very durable, but is apt to warp after conversion. One of the greatest advantages of larch is the demand for the thinnings. In some districts at the present time poles suitable for rustic work and pergolas will fetch a price equivalent to 2s. 6d. to 3s. per cubic foot. It is the only tree whose thinnings are more valuable than the mature timber.

The Douglas Fir.—This tree should be included in places where the rain fall is good and the position is sheltered. The latter point is important as the tree is apt to lose its top in exposed places. In Devonshire and the Lake District it grows extremely rapidly and is of sleeper size at 30 years. It prefers deep moist soils, and must be grown pure, as it is liable to suppress other trees by its rapid growth. It may be planted up to 9 feet apart, as the branches are very persistent, and must be hand pruned. It is rather a wasteful tree when grown as large timber, as it has such a heavily branched top. Whilst still an experimental tree as regards trade requirements it has very great possibilities, indeed as the timber is only slightly inferior to larch and its productive powers are much greater.

TREATMENT.

In reorganising the forestry work on an estate, and working out a definite policy the areas will fall into three classes for sylvicultural treatment.

(1) Areas for planting.
(2) Planted areas.
(3) Coppice areas.

(1) *Areas for Planting.*—One of the first points for consideration is the question of distance between plants. Owing to largely increased costs it would seem that if it is possible to increase distance, the chief factors on which successful planting depends may be summarized as follows :—

(1) Soil protection.
(2) Pruning.

It is necessary for the fertility of the soil that the production of humus be encouraged as much as possible, and this is especially important on the drier soils, as exposed areas of this kind lose much moisture by evaporation. And again it is necessary to have certain trees, especially conifers, as branch free as possible.

The advantages of close planting are as follows :—

(1) A large amount of thinnings to be taken out. This is particularly useful in the case of larch, which sells readily.
(2) A greater amount of natural pruning takes place and boles are therefore cleaned at slight expense.
(3) There is less necessity to replace dead plants.
(4) The ground after felling is bare and smaller and cheaper plants can be put in.
(5) There is a greater choice when cutting out poles during thinning operations.

The disadvantages are :—

(1) Higher costs of planting as a whole.
(2) Greater danger from wind.
(3) Much greater percentage of deaths.
(4) Greater liability to disease.

No. 1 is to-day by far the most important.

Turning to wider planting the disadvantages are :—

Need for filling in every blank. These should not, however, be very many.
(2) Some hand-pruning might be necessary with certain species.
(3) The ground is not kept so clean.

The advantages are :—

(1) Less plants are required.

(2) The labour bill for planting is lower. These two are very important points. Planting at 4 feet apart 2,722 plants would be required against 1,700 at 5 feet. The saving at the wider distance would be over £3 per acre.
(3) Less staff need be permanently employed.
(4) Thinning is cheaper and easier.
(5) There will be less danger of length at the expense of girth.
(6) Larger plants can be used.
(7) There will be fewer deaths, and less danger from disease or wind.

No argument is sufficiently strong to outweigh that of the cheap initial costs of wider planting, but if it is adopted careful consideration must be given to species and soil. Quick growing types forming a canopy fairly early may be spaced fairly widely. On light soils it is necessary to plant rather more closely, especially as regards Scots.

Larch and ash may be planted safely at 5 feet apart. Poplars and willows are extremely light demanding, and must be put in at not less than 12 feet intervals. Douglas Fir can be planted at intervals up to 9 feet apart, as it forms a quick canopy, and it *must* be hand pruned.

Planting.—The method used depends very much on the soil and species. Notching is by far the cheapest, but can only be done on very light sandy soils. The cost varies from 10s. to 15s. per 1,000. Pit planting is most usual. It is rather more expensive than other methods, but is the safest, especially with unskilled labour. On the lighter soils it should be done for 50s. per 1,000. Mattock planting is cheap, and good especially on rocky or sloping areas. Care must be taken in the latter case that the hole is perpendicular. It may be done from 25s. per 1,000 upwards, depending on circumstances. Where possible, pit planting should be given out as piece work, but this is not advisable in the case of mattock planting, as greater care is needed. On clean light soils with a sour top layer, a double furrow can be taken off at 4 feet intervals, and 2 year plants notched in the furrow. This has been done recently in East Anglia, the cost of notching working out at 10s. per 1,000, exclusive of ploughing.

RABBITS AND RABBIT WIRING.

In spite of everything there are still many people who do not realise the enormous amount of indirect damage done by these pests. In places where rabbits are few and well under control, the cost of planting is greatly decreased. It is unfortunate that on some estates, especially those where the shooting is let, rabbits are encouraged in order to help to pay expenses. On such places profitable forestry is practically impossible. Where netting is necessary its cost must be kept down to the minimum. Strong posts, except as strainers, are unnecessary, and rough thinnings from the woods should be utilized as much as possible. Posts should be pointed and driven in. Digging holes adds to the expense. Fencing small areas must be avoided. It costs £14 to fence one acre; £44 to fence 10 acres; £100 for 50 acres approx.

Cost per acre:—

1 acre	£14	0	0
10 acres	4	8	0
50 acres	2	0	0

Basis of calculation:—

3ft. 6in. netting, Gauge 18, 1¼ inch mesh, @ 1s. per yard fixed.

MIXTURES.

It may be taken as a general rule that all broad leaved light demanders, and larch, will do best in mixtures with shade bearers. Otherwise the soil deteriorates and the humus is wanting or destroyed. In a mixture, the light demanding trees are drawn up by the other species, and thus gain length and cleanness. The best larch and ash is found mixed with sweet chestnut or beech. The best oak is found with beech. When all species grow equally fast they may be planted singly, otherwise small groups are best. Sweet chestnut is best grown pure, otherwise the timber is coarse. Douglas must be grown pure, as it must be artificially pruned and outgrows everything else. All other conifers should be grown pure, and comparatively close.

PLANT INDICATORS.

A very elementary knowledge of botany may be utilized for the purpose of fixing the species suitable for certain soils. The method is simple and consists of making careful notes of the vegetation to be found on the area. This will be a good guide in many cases to the type of soil, and the amount of moisture or otherwise to be found in it.

On low lying damp areas suitable for poplar and willows, alder and inferior oak and ash will be found. Moisture loving plants will be present, of which the following are a few:—King Cup, Ladies' Smock, Sedge, Carex, Forget-me-Not, Iris, Flag, Tussock Grass and Rushes.

Heavy Wet Clays: Ferns, Horsetail, Ivy and Honeysuckle.

Limestone formations suitable for ash: Wood Garlic (*A. ursinum*), Red Campion, Valerian and Dog's Mercury.

On chalk under heavy shade (*i.e.*, Beech wood): Yew, Violets and small Orchis.

Dry sandy soils suitable for Scots and other pines: Heather, Birch, Juniper

Bramble, Foxglove, Bracken and Gorse are indicative of fresh soils where larch might well be tried.

This subject of plant œcology has been but little touched on, and there is plenty of room for research in it. Whilst the average owner or agent has little time for the serious study of botanical, geological and entomological problems it is sincerely to be hoped that the Forestry Commission will realize the unique opportunities thev have, to assist the private forester along these lines.

AREAS ALREADY STOCKED.

One of the most usual things to find when inspecting such areas is that there is a large gap in succession, owing to the lack of a regular planting policy. There may be woods of up to 20 years and woods of from 50 years upwards, and on the other hand there may be old woods, and few or no plantations. In such cases the only thing possible is to spin out mature fellings over as many years as possible, so as to have some kind of income each year, until the younger woods come to felling age. Care must be taken, however, not to let timber become over-mature. Oak can go for 200 years, and beech for 150 without danger, but ash when mature must be felled at once. If left to stand, as is so often the case, the loss per annum will be at least 2½% of the value, and from being valuable timber it will become merely fit for local demand and rough planking. Sweet chestnut cannot be allowed to stand for over 65 years without deteriorating rapidly.

It is often advantageous to fell mixed woods by species and not by area.

The mistake of cutting out the best poles on young areas should be avoided. Badly grown trees never make good timber. Farmers do not send their best calves to the butcher. When thinning the forester should always keep in his mind what his ultimate object is to be.

A common type of young plantation, especially when planted under contract, is the " nurseryman's mixture," consisting of many different species of conifer and hardwood, mixed without rhyme or reason. Such a planting will never make a good plantation, and must be treated as quickly as possible. In such a case determine the species that promises best, both from a sylvicultural and financial point of view, and fill up all blanks with the same. Take all other trees out as thinnings. If the two best trees are larch and ash the plantation will then have a definite object—the growing of good larch and ash. In ways such as these a definite plan can be gradually worked out.

COPPICE.

It may be taken as a fact that the day of hazel and mixed coppice is over, and unless these areas are converted to some other type of forest they will never be any use to the estate from the sylvicultural point of view. This conversion should be as simple and economical as possible. The value of " growing on " selected shoots from stools is extremely doubtful, as these seldom produce sound timber of any size. A solution of the difficulty is the cultivation of poplar, for the following reasons : -

(1) Owing to the wide intervals at which it can be planted, the area could be fully stocked by planting 50 to 100 trees per acre. Netting is done on lines already indicated. The netting rings need not be more than 3 feet high, and if hares are scarce can be even lower. The wood will lose none of its value for sporting purposes.

(2) The coppice will provide the necessary humus and prevent evaporation. It will also prevent the growth of grasses and weeds which are injurious to poplar in its earlier stages.

(3) The standards can be planted without expensive clearing, or cutting back, provided enough air and light is assured for the growing tree.

(4) The light canopy of the poplar will not be injurious to more valuable species, such as ash or chestnut, that may be on the ground, and which should be encouraged.

(5) It is a safe and easy tree to plant. Very accommodating as regards soil, and most varieties succeed on clay. It is extremely resistant to frost.

(6) Financial returns should be good owing to the rapid growth and low cost of production.

The late Mr. H. J. Elwes, after careful investigation and much experience, states :—" Assuming that there were 75 trees to the acre, I should expect to get at 40 to 50 years of age in a good damp, but not peaty soil, in the south or east of England, at least an average of 100 to 120 feet per tree, equal to 7,500 to 9,000 cubic feet per acre, or by planting 100 to the acre we might get 2,500 to 3,000 at 25 to 30 years of age, which at a shilling per foot would give a far higher return than any hardwood tree."

This estimate is therefore equivalent to £375 to £450 per acre at 40 to 50 years or £125 to £150 per acre at 25 to 30 years. Mr. P. T. Maw considers that about 6,000 cubic feet at 50 years is the greatest yield that can be expected. If this proves as a whole more accurate than Mr. Elwes's figures, it is at any rate equivalent to £200 per acre, which taking into consideration the low cost of production and the comparatively inferior soils that can be utilized, still shows that the poplar is the most profitable deciduous tree to plant.

The production of pure chestnut coppice should be encouraged as much as possible. This is best grown on a rotation of from 10 to 14 years. There is a large demand for these poles for "Chespale" and other split fencing, and in the southern counties good coppice of this type has realized recently £60 per acre. Soils too stiff for the production of large timber will often grow a good type of pole for this purpose. It must be grown quite pure, and all standards of oak, etc., must be removed. Chestnut is not a true shade endurer, and poles growing in the vicinity of standards will incline towards the light, and growth will not be straight. Areas should be kept well covered, and blanks filled by planting or layering.

FELLING, VALUATION AND SALE.

Felling over small areas should as a rule be done by the estate staff. Large areas should, if possible, be sold standing, to be felled by the buyer. He will have the necessary tackle and can get the timber down and out far more quickly, and with less damage than an estate staff working with comparatively untrained horses. Beech, ash and sycamore should always be sold standing, subject to measurement when down. They deteriorate rapidly when lying in the woods, and must be removed as quickly as possible. If felling is done by the estate it should be done by piece work, by the cubic foot. Prices at present are roughly 12s. 6d. for hardwoods and 7s. 6d. for conifers, per 100 cubic foot.

VALUATION AND SALE.

It may be taken as a fact that timber has no definite price, and that to attempt to value by species is utterly useless and misleading. Elm worth 6d. in Surrey may be worth 1s. in Notts, beech worth 1s. in Bucks may fail to realise 4d. in Devonshire. There are several factors affecting the value of timber and careful consideration must be given to each. There is only one basis for working out the value and that is the cost of the converted article, and from thence, it must be worked back to the standing tree, as per the following example: Large clean Scots pine standing near a good road on the level, extraction easy, bench within a mile. Price of converted article 2s. 4d. per cubic foot. Deduct for felling 1d., for transport 1d., for conversion 1s., profit 3d., total deduction 1s. 5d. Value standing, 11d.

The question of classification is highly important, and much more attention should be given to it. One of the reasons why foreign timber competes so successfully with home-grown material is because it is so carefully graded. Swedish and Russian timber has frequently up to five different classes. Douglas Fir is imported in two.

The chief reasons for classification of home-grown timber are :—

(1) It encourages the buyers of better class timber.
(2) It brings outside competition, widens the market, and brings better prices.

Such classification need only be done roughly, and there is no need to waste money in hauling all similar lots together. No buyer of really good timber will object to small lots, and it gives the local men more chance.

Classes may be made (A) *By size* :--

e.g. Oak.	1—Trees 14 in mean Q.G. and up,	2 3.	Tape under bark.
	2—Ditto 12 to 14 in. mean Q.G.	1 6.	„ „
	3—Ditto under 12 in. mean Q.G.	1 -	„ „

(B) *By industrial uses* :—

e.g. Ash.	1—Sports trade (prime)	6/-.
	2—General work ..	2 6.
	3—Inferior	1 6.

Every endeavour must be made to keep good class timber together, and to avoid mixed parcels, or indefinite descriptions such as :— "5 oak, 3 beech," or "5 oak averaging 20 c.ft." The latter may consist of one tree containing 60 cubic feet and 4 of 10 c.ft. If possible, lengths should be given, as at the present time a long clean tree of fair girth is more frequently required than a short boled tree of large girth. This is more especially the case with oak.

Demand will affect sales. This depends on industrial conditions. A boom in the steel trade will send up the demand for ash handles, and *vice versa*. At the present time oak is required as the railways are building waggons. As in all other trades the factor of demand is, and always will be, the most difficult one to allow for.

Locality is very important as it has a large bearing on extraction and transport. Woodlands situated near road or rail present many advantages.

Larch is worth more near collieries; beech near chair factories, and ash near industrial centres. Sycamore is most valuable in Lancashire. Accessibility must also be taken into consideration.

There are woods and even forests in which, owing to the locality, the timber is practically valueless. Situated on high hills, away from rail or road, the cost of extraction would be more than the timber is worth.

In cases not so pronounced as the foregoing ones, such as deep valleys or slopes, not too far from the road, it may be necessary to employ extra horses or machinery for "tushing" or hauling out. This will increase extraction costs and thus lessen the timber value. Sometimes the roads are unequal to the traffic, and cases are known where the weight of metal put into the road was almost equal to the weight of the timber taken over it!

Careful consideration must be given to the actual means of transport—horse, steam, or tramway. Five horses will pull on ordinary roads about 225 c.ft. of timber. An ordinary steam tractor will take about the same, but it will go more than twice as fast and where it is a question of the number of journeys per day this is important. In some cases, such as a long haul in woods where a tractor cannot go, and a short haul on the road, horses will probably be cheaper.

When dealing with large acreages, tramway or "Decauville" railway will sometimes be useful, especially over soft ground where the distance is not great. Most people would be afraid of the initial cost, but if the amount of timber to be hauled is known, it is a simple matter to set a figure per cubic foot for transport, and work out the total cost that would be justified for transport by this means.

As regards method of sales, the most satisfactory method is by private treaty. especially if sales are small and irregular and the buyer is known to be satisfactory. In such cases it is a mistake to hold out for extreme value, and a give and take policy will always be best. If the sale is large and the timber good. public auction is to be recommended. Careful lotting and advertisement are necessary in order to bring outside competition. If there is a likelihood of a "ring" being formed, auction is not to be recommended. Much depends on the auctioneer in sale by auction, and care should be taken only to employ a firm who make a speciality of timber selling. Sales by tender are less expensive and render the formation of a ring more difficult, but are not popular with the merchant.

Successful marketing necessitates a thorough knowledge of commercial utilization and a careful following up of market prices. It is principally owing to the neglect of these two points that estates have lost so much money in the past. It is well known that the ridiculously low prices paid for good timber have helped the merchant to high profits far more than the prices paid for inferior qualities, and in order to succeed, those in control of woodland must make every endeavour to follow up prices, to develop new markets, and above all things, to study the consumer and his exact requirements.

II. MILK FROM SHORTHORN CATTLE ON THE UNIVERSITY FARM, CAMBRIDGE, 1909-1922.

By K. J. J. Mackenzie, M.A., A.S.I.

The Shorthorn cattle created by the Collings Brothers and their contemporaries were essentially dual purpose animals. Study of the ways of the three great breeders who followed the famous brothers, establishes the fact that though they differed slightly in ideal they, too, all had dual purpose capacity in view. Bates and his admirers may be said to have bred for *Type*, or Shorthorn character, milk and beef, Booth and their men for *Beef* type and milk; and when, later, Amos Cruickshank got to work he bred for *Constitution*, beef, type and milk. These three strains of Shorthorn cattle proved themselves so useful to the farmers of the United Kingdom that, about a hundred years after the Collings worked, their cattle, whether of Bates, Booth or Cruickshank type, peopled 66 per cent. of the farms in England, Ireland and Scotland. By about 1900, however, the overseas market had set up a very great change. For some years, nearly a generation, previous to the opening of this century, the overseas traders had given splendid prices for animals that were without serious rivals as beef producers, but which also had, and they insisted upon this qualification, the capacity of begetting stock whose milk-yielding capacity was of the lowest.

The "Beef" Shorthorn had thus become the fashion, and had, for some few years before 1900, captured all, or practically all, the prize-money given at the leading shows. Through the prizes being practically always given to "Beef" the great majority of pedigree breeders neglected, if they did not absolutely try to eliminate, the milking capacity of their cattle. As pure beef animals were not wanted by British farmers the great majority of them gave up altogether the use of pedigree sires. This naturally led to a very serious deterioration among the commercial herds of the Kingdom. We had, for export purposes, the very best beef Shorthorns in the world, but our Shorthorn cattle in the ordinary markets were year by year losing all utility points as well as all breed type except colour. The breeders of these commercial cattle had, in fact, got into the way of using any sort of description of thing that could " stop " cows so long as he was red or roan in colour. Their excuse was, of course, the fact that many high bred bulls got " duds " at the pail. There are generally two sides to a question. and it is but fair to point out that some eminent breeders had kept the dual purpose type and that they did not get the support that they deserved from the home breeder.

Very early in this century the breeders of true Shorthorns began to agitate for better treatment, and eventually in 1905 formed the "Dairy Shorthorn (Coates' Herd Book) Association." It was necessary then to call attention to milking capacity in the breed for the agricultural public had learnt to look upon the splendid beef animals, winning at all the shows, as the only true type, whereas the " Dairy " or dual purpose, had *at least* the same right to the title of Shorthorn. In 1907 the writer of this article joined the D.S.A., and in 1909 started a herd of Shorthorns for the University of Cambridge with a view to teaching students and of demonstrating to farmers the advantages of the work that Society had in view.

One of the great weapons with which the Association worked was the *Milk Recording Sheet.* It is now known how absolutely essential that weapon is to those who wish to improve or maintain milk-producing capacity among their herds. In 1905 the D.S.A. had a very small circle of followers who knew of its value and a very large number of British farmers had never even heard of milk recording. The success of the Association, and it is quite unnecessary to emphasise how successful they have been, being very largely due to milk-recording does not, however, make it useless to study other factors or " points " which indicate milking capacity in a cow. Then unless one had a very long purse to go to, which was *not* our experience, recorded stock were unobtainable: now-a-days this is still to a certain extent the case. Milk recorded cows are very dear, so much so that the man with limited capital is in the same position as was the writer in 1908 and 1909 when looking for cows with which to lay the foundation of a milking herd. That is to say a beginner must, when starting with a very limited purse, go and choose cows on " points," and by means of milk recording, breed up through his own perseverance, a herd of dual purpose cattle.

The University herd was dispersed in September, 1922 and Mr. H. Davidson, our University Demonstrator, has got out the following table showing what results may be obtained from foundation stock bought on " points " without any records behind them.

DETAILS OF SALE ON UNIVERSITY FARM, SEPTEMBER 13TH, 1922.

Foundation Cow.	*Price of Foundation Cow*			*Offspring in Sale.*	*Age.*		*Sale price of offspring*	*Number of offspring in Sale.*	*Average price of offspring.*
Number.	£	*s.*	*d.*		*Yrs*	*Mths*	*Guineas*		*Guineas.*
(1) Age 2 yrs. 7 mths when purchased.*	20	0	0	Cow	3	9	95		
				Bull	1	3	24	2	59½
(2) Age 7 yrs. 0 mths. when purchased.	35	14	0	Cow and cow calf (aged 3 days)	6	11	236		
8,677½ lbs of milk in 310 days from 1/10/10 to 30 9/11 D S.A. Year Book.				Cow and bull calf (aged 79 days)	4	9	92		
				Heifer	1	7	70		
				Heifer	1	6	42		
				Heifer	1	5	17	5	91½
(3) Age 4 yrs. 9 mths when purchased.	35	0	0	Cow†	7	9	28		
				Cow and cow calf (aged 187 days)	6	2	77		
10,225½ lbs. of milk in 328 days from 1/10/10 to 30/9/11 (after twins)				Cow	5	5	75		
9,392 „ „ 303 „ „ 1/10/11 „ 30/9/12 (D.S.A. Year Book).				First calf heifer .	3	5	85		
				Heifer	2	6	130		
				Heifer	2	5	56		
				Heifer	2	3	77		
				Heifer	1	7	45		
				Heifer	1	3	22		
				Heifer	1	1	36		
				Bull	3	5	85	11	65
(4)				Cow	4	7	160		
Age 4 yrs. 8 mths. when purchased.	45	0	0	Cow	4	1	48		
				Heifer	3	4	65		

7,518 lbs. of milk in 252 days from 1/10/10 to 30/9/11 8,751 " " 287 " " 1/10/11 " 30/9/12 10,262 " " 335 " " 1/10/12 " 30/9/13 10,526 " " 309 " " 1/10/13 " 30/9/14 9,455 " " 321 " " 1/10/14 " 30/9/15 (D.S.A. Year Book).				Heifer	2	8	52		
				Heifer	2	2	56		
				Heifer	2	2	52		
				Heifer	2	1	22		
				Heifer calf	0	11	31		
				Heifer calf	0	8	36		
				Bull calf	0	8	23	10	54½
(5) Age 4 yrs. 7mths. when purchased.‡	31	10	0	Cow	5	9	77		
				Heifer	2	0	60		
				Bull	1	0	60	3	65¼
(6) Age 4 yrs. 1 mth. when purchased.	31	10	0	Cow	5	5	70		
				Cow	4	5	36		
8,377½ lbs of milk in 323 days from 1/10/11 to 30/9/12 8,354 " " 327 " " 1/10/12 " 30/9/13 8,666½ " " 323 " " 1/10/13 " 30/9/14 10,006 " " 256 " " 1/10/14 " 30/9/15 9,948½ " " 328 " " 1/10/15 " 30/9/16 (D.S.A. Year Book).				Heifer	2	1	22		
				Heifer	0	11	29	4	39¼
(7) Age 1 year 8 mths. when purchased §	9	0	0	Cow	4	3	34	1	34
7,292½ lbs. of milk with her 1st calf from 1/10/10 to 30/9/11 7,563¾ " " " 2nd " " 1/10/11 " 30/9/12 8,559 " * " " 3rd " " 1/10/12 " 30/9/13 8,445½ " " " 4th " " 2/10/13 " 30/9/14 8,915 " " " 5th " " 1/10/14 " 30/9/15 8,777¾ " " " 6th " " 1/10/15 " 30/9/16 9,284½ " " " 7th " " 1/10/16 " 30/9/17 (D.S.A. Year Book).									

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* Owing to accident no record could be taken, but was obviously a good milker.

† This cow was an uncertain breeder, practically sold as a store.

‡ Directly, within an hour, upon arriving on the farm, after a terrible journey, this cow had a difficult calving, from which she never recovered, and not standing to bull had to be fed off for butcher.

§ We were unfortunate with the heifers this cow bred, but she proved a wonderful bull breeder.

Most unfortunately, again owing to economic considerations, the bulls for the herd had to be bought cheap. A few sovereigns over butcher's price was our utmost endeavour! This involved using some that had no "recorded" cows in their pedigree! It was a most undesirable economy and luckily, now there are so many more bulls about, quite unnecessary. In 1907 and 1908 there was in this kingdom, one bull with a "milk pedigree," whereas now there are at least ten. So that any beginner would be foolish in the extreme if he tries to breed up a herd with any other description of sire.

It is, however, not only as regards purchasing foundation cows that these "points" are useful. If one could afford to buy pure Shorthorns proved by pedigree to be of dual purpose capacity, and breed from those giving most milk, using bulls of the same breeding as the cows, the thing would be simple. But, unfortunately, with limited capital such cows cannot be obtained. Very many herd-book Shorthorns are descended from pure beef bulls, others are descended from cattle that have lost, through careless breeding carried through several generations, much of the flesh they ought to carry. For it is possible to so breed Shorthorns, that you get a thin-fleshed milking machine; it is just as possible to do this as to breed a thick fleshed beast without any milk. So it was found with the University Farm cattle. At first they came of four types, as follows: (1) Milk and Beef; (2) Beef and no milk; (3) Milk; and (4), No Beef *and* no milk. It is permissible, however, to point out that these last-named, though very bad milkers indeed, and not thick fleshed, were at least as good as the average "Store" to be bought on open market!

It is obvious that unless all the heifers can be profitably retained till they calve and can be tested by milk-recording, it will be necessary, or, at any rate, very convenient, if we are in a position to pick out Classes 2 and 4 and feed them off instead of "bulling" them on. This is another reason for studying "points" which denote milking capacity. Hence it is hoped that the following remarks on this very interesting study may be found useful.

Touch. Any observer must have convinced himself that a moderately thin skin, covered with mossy hair, must be present; this skin, however, if it is to indicate milking capacity, should be "*alive,*" *i.e.*, be elastic and ample, running freely over the underlying structures, as, for instance, over the ribs, the "hooks," and at the Paunch. Unfortunately, heifers are not always in the best condition and condition does largely govern this "touch." Luckily however, in the heifer, "Touch," to a very considerable extent shows itself to the trained eye. Heifers that are going to milk will show plenty of folds of the skin on the neck, and creases of such folds *will show right down the face.* Of course, these folds and creases will be most easily seen when the animal bends her head round slightly to look at the observer. But once the student of these points has taught himself to look for these folds or creases he will see if they are there or not with every movement of the animals. Not only should there be many folds, but they should be markedly different in size, and all should be small. Large coarse folds are indications of poor milking capacity. This quality of skin, shown on the neck and face, are helpful when selecting a sire. The point is not so pronounced in the male and young bulls are seldom kept so short of condition as heifers, hence their handle is generally more reliable. Furthermore, heifers are periodically disturbed by sex troubles, which condition is apt to quite destroy the quality of " touch "

The Udder. In the cow the quality of " touch " at the udder should be even more pronounced than that of the hide. There should be plenty of thin elastic skin and if handled between finger and thumb the doubled-up folds should run over one another freely ; giving quite a delightful sensation to the hand of the student of Dairy Cattle. The gland itself, under the skin, when it is carried by a good milker, tells the skilled hand that it is *living tissue.* A gland under the skin that feels putty-like, however large it may be, indicates an accumulation of fat in the tissue that is pretty certain to stop that very active functioning of the milk-forming tissue which has to go on if the cow is to give a good record. A cow with this putty-like touch under the skin of the udder may milk deeply after calving, but won't last.

Again, this most valuable " point " is apt to be upset by many things, such as recent calving, a cold night, sexual disturbance, and so it should not be let stand alone ; the other points must be looked for. When, however, the cow is right in every way there is no hope of her being a good milker if her udder does not touch right.

In the young heifer the arrangement of skin between the hind legs should resemble that of the neck. There should be many folds and creases, all of them small, but differing greatly from one another in size. The skin that is ultimately to cover the udder, as well as the adjacent skin on the thighs, should, if the animal be well, handle moderately thin, very soft and elastic and full of life ; coarse hair is always undesirable ; but whether in condition or out of condition the folds, plaits and creases should always show that the touch will come with return of perfect health.

As regards size, it is agreed that a bag should be wide and carried well up behind and well forward. It is further not disputed that it should be large before milking and should collapse after milking. A " silk handkerchief " bag denotes this latter idea. In collapsing, either after milking or when the cow is dry, the same arrangement of folds or plaits should be seen as is described above under " Touch."

Beyond asking for " teats " that a man can get hold of and milk easily, the writer sees no particular advantage in the utility breeder striving after shape of udder. This is, from the show point of view, *heresy*, but having examined very many cows in many herds the writer feels certain that the beautiful, and he freely acknowledges its beauty, " show bag " is not necessary in the rent-earning cow.

There is one exception, perhaps ; a floppy swinging udder seems to be bad in as much as it is likely to go wrong. It would seem that these shaped bags are the ones that most often give blood-stained milk, and this weakness seems to be inherited from the mother by daughters, even when their own bags are not floppy.

Milk-veins and " Wells." Everyone, we believe, knows that it is a good sign for a cow when just coming into profit to show large and much contorted veins running along each side of the floor of the belly. Indeed, with many first-calf heifers, and, in fact, with some older cows, there is so much activity among the blood vessels of the milk-making tissue which forms the udder, that even huge milk-veins are not large enough to deal with the increased circulation, and the whole of the parts, including the navel, swells dangerously. All who have any pretence to be observant have seen these large twisted veins in good milkers and noticed that they are less pronounced in inferior performers. But this knowledge is of little use when the cow is dry, for at such times these blood-vessels practically disappear in both good and poor milkers alike. But this latter is not so with the so-called " Wells," the holes in the breast bone (or Sternum) where the milk-veins pass into the body. These can always be found in dry cows that are not quite old, or who are not much too fat. The larger these openings in the bone are the better. It is easy to accustom the hand to a rough measure by inserting the tip of the little, middle, or the second finger one after the other into the " well."

There was a time when the writer looked upon the " well " as a deciding point which could not mislead. Unfortunately the study of the herd that is being written about taught otherwise. Cattle with small " wells " never prove really good milkers, but cows we want to avoid sometimes have splendid " wells." These are "splitters" that inherit "beef" but also very moderate milking quality. It is a fact that you will find among the well-fleshed daughters of a bull, all out of deep milking cows, cattle that will milk deeply, cattle that are *duds*, and cattle that are half way between good and bad milkers. Say they will give 250 gals. with first calf, 400 with second, and 500 or 600 with subsequent calvings. Perhaps with a very fortunate lactation period they will give 700 gallons in the milking year of 45 weeks. These half-and-half milkers sometimes have large "wells" that would deceive any novice. On the other hand, the writer has never seen a cow with the right sort of "touch" both to handle at the various points, at the udder, etc., and showing the right folds and seams on the face and neck, and which also had large "wells" that did not milk really well. Among dairy, or true Shorthorns, a cow that gives per annum an average of 750 gallons of milk with her first six calves within a period of six years is what is meant by milking really well. To give that yield, drop a bull calf that will make a first class steer and leave a first-rate carcase of cow-beef at the end of the time should be the ambition of every Shorthorn breeder who wants an animal useful to the general farmer. It was the aim to do this on the University farm, and we contend that the details of the sale, here published, prove it can be done.

Many other milk-indicating points have been paid attention to. Head long from eye to nostril; a light fore-end wedge-shaped over the shoulder; great depth through the heart; well sprung ribs; large, firm abdomen; are all useful indications, but have been much discussed, written about, and are very generally held to be obviously required. When, however, we come to the hind-quarter it would appear that some further comment is required. All are agreed that long "quarters" which are wide at the hooks *and at the pin-bones* and are level with the back make a suitable frame on which to hang a capacious milking vessel, and one which allows of an easy calving. It is in the matter of thighs, rounds and buttocks that many breeders ask too much.

French Zootechnists have always taught that thin bent thighs in the heifer are a sign of milking capacity. Watching the herd for the last ten years on the University farm has confirmed the impression that the judges of dairy stock among our Allies are right as regards this "point." It is not intended to imply that the distance between "meat and hock" should be as long nor that there should be the same complete absence of "rounds" as there is in, say, the Jersey. But it is intended to imply that "meat down to the hocks" and full deep rounds and deep flesh through the "aitches" are signs that mean bad milk production. There are exceptions, but even the prodigies who show such beef points and yet carry fine " bags " and give good yields are bad reproducers of their own milking points in their daughters. As regards the bull, all experience as well as common sense shows that the sire with fine, deep " rounds," and who shows " thick flanks " right down to the hock should be avoided unless the milking records of the females, for *several generations*, in his pedigree establish that he is not a " splitter." Our experience leads us to believe that such a sire will never be found. It is here as well as " over the shoulder " that the pure beef animal will always beat the dual purpose animal in " fleshing " points.

III.—A SURVEY OF THE INSECT PESTS OF CRUCIFEROUS CROPS.

By Herbert W. Miles, B.Sc. (Bristol),
Biologist Kirton Agricultural Institute.

" The insect that infests turnips and many crops in the garden (destroying whole fields while in their seedling leaves) is an animal that wants to be better known. . . . . A knowledge of the properties, economy, propagation, and, in short, of the life and conversation of these animals, is a necessary step to lead us to some method of preventing their depredations."—GILBERT WHITE, " *Natural History of Selbourne.*"

Since the above was written, over a hundred and fifty years ago, the vital importance of a knowledge of the insect pests with which he has to deal has been brought home to the farmer by such writers as John Curtis and Miss Ormerod, and at the present day many scientists are studying those pests annually responsible for heavy losses to the agriculturalist. With the increasing knowledge of pests and the development of modern methods of control by wet and dry spraying, growing resistent varieties, assisting natural controlling factors and employing suitable cultural methods it is possible to secure a good measure of control. It is necessary, however, that the man in the field should be able to identify the type of attack and apply certain measures which will at any rate check the progress of the attack pending the arrival of specialised instructions for dealing with more serious outbreaks. To be in a position to do this the grower must be familiar with the broad outlines of the life histories of the common pests and with the general principles governing their control. John Curtis (8) realised this when he wrote :

"It is a fact which I particularly wish to impress upon the mind of the agriculturalist, that any insect feeding upon his crops may prove a great loss to him when it multiplies to excess, and this renders it most essential that he should be able to detect the first appearance of his enemies, and watch their progress; which he cannot do with certainty, unless he will make himself master of their habits, and become so well acquainted with the insects affecting his crops as to be almost able at the first glance to detect them. When this is accomplished, he may hope to learn how to deal with the enemy opposed to him, and instead of suffering a small number of destructive insects to pass unheeded, which . . . . . may multiply by millions in a few weeks, he may employ his best energies to crush immediately the worm in the bud."

In this country it is probable that the various species of *Brassica* are cultivated by the widest range of growers—farmers, market gardeners, private gardeners, allotment holders and cottagers, all producing some members of the family. Since so many growers come in direct contact with this group of plants a survey of the insect pests which attack them and of control measures which have been proved effective may be of use in assisting in the recognition of enemies and their timely destruction.

KEY FOR IDENTIFICATION OF INSECT PESTS OF CRUCIFEROUS CROPS.

		PAGE
(A) *Root attacked.*		
1.—Surface tissue with shallow gnawings	*Wireworm*	30
2.—Roots severed, or with penetrating holes	*Cutworm*	50
3.—Tunnellings; few lateral roots; presence of rot and white maggots; leaves wilting	*Cabbage Root Fly*	59
(B) *Stem attacked.*		
1.—Surface galled—smooth, round or irregular galls	*Turnip Gall Weevil*	41
2.—Large penetrating holes in turnips and swedes	*Cutworm*	51
3.—Turnips with gnawings or tunnellings at the leaf bases or in the crown	*Turnip Mud Beetle*	34
4.—Young plants with stem severed below or at ground level—		
(*a*) Presence of brownish caterpillars in surface soil	*Cutworm*	51
(*b*) Presence of tough, brownish, legless maggots in surface soil	*Leather-jacket*	57
5.—Young plants with centre of stem tunnelled; presence of small, creamish, six-legged grub	*Cabbage Stem Flea Beetle*	37
(C) *Leaves attacked.*		
1.—Shot holes in leaves; slight webbing in centre of plant	*Diamond Back Moth*	52
2.—Irregular patches eaten out; presence of frass		
(*a*) Greenish or yellowish spotted caterpillars present about the leaves	*Cabbage Butterfly*	45
(*b*) Dull greenish caterpillars in heart or possibly in surface soil	*Cabbage Moth*	48
(*c*) Brownish caterpillars in surface soil	*Cutworm*	51

		PAGE
3.—Under surface destroyed; surface tissue entire but brown and semi-transparent; presence of grubs, olive green with black tubercles, feeding close together	*Mustard Beetle*	38
4.—Seed leaves eaten in holes or mined	*Flea Beetle*	35
5.—Backs of leaves infested by—		
(*a*) Brownish, mealy aphids	*Cabbage Aphis*	62
(*b*) Minute white, winged insects	*White Fly*	64
6.—Leaves eaten; presence of slaty caterpillars, feeding along edges..	*Turnip Sawfly*	44
7.—Leaves blistered or mined, presence of legless maggots	*Leaf Miners*	61
8.—Leaf bases swollen, crown distorted, "Multiple top"	*Swede Midge*	55
(D) *Flowers attacked.*		
1.—Flowers infested with small black beetles or small white grubs	*Pollen Beetle*	40
2.—Flowers spun loosely together, pale green caterpillars present	*Diamond Back Moth*	53
(E) *Seed Vessels attacked.*		
1.—Surface tissue eaten in irregular patches	*Mustard Beetle and Pollen Beetle*	38
2.—Seed vessels pierced with holes	*Seed Weevil* (adult)	43
3.—Portion of seed vessel turning yellowish and splitting open, small yellowish maggots inside	*Seed Midge*	54
4. Seed containing fleshy white grubs	*Seed Weevil*	43

WIREWORMS, LARVÆ OF *Agriotes* SPECIES.

The larvæ or grubs of the *Agriotes* species of beetles are probably the most common and widely distributed wireworms. They are among the most destructive pests of turnips and swedes because they gnaw through the young roots of one plant, then migrate to another and destroy that in the same way. In addition to this damage, they are the indirect cause of much loss through rooks and jackdaws, which pull up the young plants in search of the wireworms at their roots. This pest, unlike most of the insect enemies of the farmer, has an exceedingly long life, Rymer Roberts (28) stating that they exist for as long as six years. It is not surprising, therefore, that, having so long a period in which to work destruction among crops, Theobald (36) should characterise them as "by far the most obnoxious farm and garden pest." Wireworms are by no means restricted in their feeding habits and voraciously devour roots, cereals, fodder crops, garden crops, and even choice flowers, such as carnations. They are, moreover, often most destructive to potatoes and tomatoes, frequently tunnelling up the stems of the latter when grown in pots in greenhouses, and causing wilting and, ultimately, death to the plants.

Wireworms are the larvæ of click beetles. These beetles, when disturbed on vegetation, fold their limbs close to their bodies and fall to the ground, where, if further molested, they arch their backs, and, by means of a special arrangement of the thoracic segments, are able to jerk themselves into the air, at the same time producing a sharp *click*, from which they derive their name. The beetles have peculiarly elongated bodies; the head is almost hidden under the front of the thorax, and the abdomen is long and narrow. The thorax is closely punctured and is produced to distinct points directed backwards and forming a close association with the wing sheaths, or elytra. The general colour is brownish or brownish black and the thorax is usually rather darker than the rest of the body.

Life History.—The eggs are generally laid in grassland or land growing a temporary ley. They are deposited in the surface soil near the roots of plants, the female click beetle entering crevices between lumps or clods of soil or shallow cracks, and laying her eggs either singly or several together. Egg-laying takes place in June and July. Referring to this stage, Roebuck (26) writes:—"The eggs are too inconspicuous and too difficult to find to be known to many, and so, too, are the tiny wireworms which hatch." Rymer Roberts (27) gives the maximum incubation period as about one month.

On hatching, the minute larvæ at once make their way deeper into the soil, and the first two years are spent in a greater or less degree of obscurity, their food consisting probably of decaying animal or vegetable matter. During this time growth and development take place and the larvæ moult several times, gradually assuming the usual coloration of wireworms and increasing in length to 10-11 mm. It is about this time that they begin to be definitely recognised as wireworms, and until they are fully fed, justify the statement of Curtis (8): "In the wireworm we have an example of a larvæ which may almost be termed omnivorous . . . . . for it will feed upon corn, turnips, mangel wurzel, potatoes, grass and cabbages, as well as upon the roots and stems of the choicest flowers." In appearance the wireworms are long and thin and highly polished. Their prevailing colour is yellow, but as they get older and increase in length they become darker, gradually assuming a yellowish brown tint. They are tough and leathery, and are provided with prominent and sharp jaws in the well-developed mouth. There are three pairs of legs near the head, which is darker than the remainder of the body, and the tail tapers off rather abruptly. In movement it is usual to find the body being carried practically straight and the tail sharply curved to one side.

When fully fed (Fig. 1) and measuring about an inch in length, the wireworms go deeper into the earth and, constructing rough cells in the soil, change into pupæ, or chrysalids. This usually takes place towards the end of summer and the beetles may emerge from their pupal coats in the autumn and remain in the cells until spring before appearing above ground.

Control Measures.—The worst infestations by wireworms occur after ploughing up grassland or ley since these sites are most suited to the egg-laying requirements of the female beetles; moreover, owing to the great duration of the larval period. wireworms may be expected to cause damage for quite five years after the breaking up of this type of land. It frequently happens that the crop immediately following the breaking up is fairly free from wireworm attack, but the subsequent crops suffer greatly from their depredations. Oats are often taken after the breaking up, and in some cases these are followed by potatoes. In the Report on Insect Pests for 1921 (22) it is stated that in one instance where potatoes were grown on heavily infested fields the succeeding crops were uninjured, presumably on account of the removal of the wireworms in the potatoes.

Wireworms suffer very much when dry conditions prevail, hence the promotion of soil mulches in dry seasons may be of considerable value in reducing their numbers.

Cultural treatments have apparently given satisfaction from time to time. In Ireland (13) the following manurial dressing was recommended for oats likely to be attacked :—

1 cwt. sulphate of ammonia.
3 cwt. superphosphate.
3 cwt. kainit.

and Harper-Gray (12) shows that top dressing with sulphate of ammonia and harrowing, rolling, and the use of 25 per cent. more seed have given very substantial benefit.

Wireworms are reputed to dislike certain crops, mustard and linseed being mentioned. In certain cases the ploughing in of mustard has given good results, and Miss Ormerod (23) quotes instances where mustard, allowed to grow about a foot or 18 inches high before being ploughed in, was recommended by contributors to the Royal Agricultural Society's Reports. With regard to linseed in one instance (18) the writer calculated an infestation of approximately 26,780 wireworms per acre during the year following a linseed crop, indicating that though the linseed was not attacked large numbers of wireworms remained in the soil to attack succeeding crops.

The use of rape dust or crushed rape cake has been discussed by Miall (17) and Ormerod. Both these authorities state that rape has proved very attractive to wireworms, and that where drilled with

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Fig. 3. (*a*) Cabbage Flea (*P. Cruciferæ*) (× 7).
(*b*) Turnip Flea (*Phyllotreta nemorum*) (× 7).

Fig. 7. Pollen Beetle, *Meligethes Sp.* (× 13), and Young Larva (× 50).

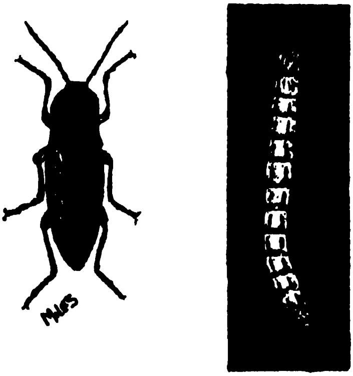

Fig. 1. Click Beetle (*Agriotes obscurus*) (× 2) and Wireworm (× 1½).

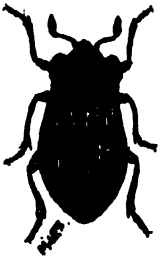

Fig. 2. Turnip Mud Beetle (*Helophorus rugosus*) (× 5).

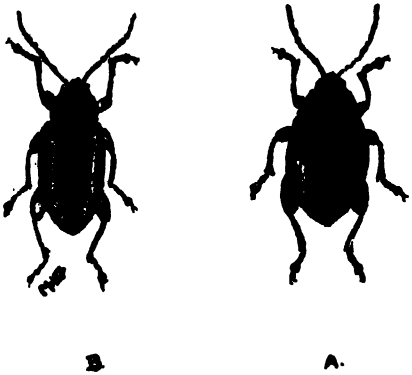

Fig. 3. (*b*) Turnip Flea (*Phyllotreta nemorung*) (× 7).

(*a*) Cabbage Flea (*P. Cruciferæ*) (× 7).

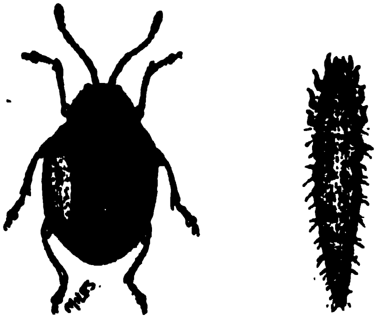

Fig. 4. Mustard Beetle, *Phaedon Sp.* (× 6), and Larva (× 5).

FIG. 5. VIEW OF MUSTARD FIELD SHOWING STUBBLE WHICH HARBOURS THE MUSTARD BEETLE (*Photo, H.W.M.*).

FIG. 6. MUSTARD STUBBLE OPENED TO SHOW HIBERNATING BEETLES. *Phaedon Sp.* Approx. Natural size. (*Photo, H.W.M.*).

the seed good results have followed, apparently on account of the wireworms feeding on it in preference to the developing crop. This method is, however, not to be recommended, in that it would appear to encourage the pest, rather than destroy or remove it.

From a consideration of the foregoing, control of the wireworm would probably take the form of :—

1.—*Cultivation :* Aiming at promoting a dry dust tilth during the hottest part of the year, exposing the insects to birds, and restricting their movements in the soil.

2.—*Application of stimulants to the crops :* Aiming at promoting rapid and vigorous growth so that the plants are well established before serious injury occurs.

3.—*Use of poison dressings,*

Generally swedes and turnips occur in the rotation following a straw crop, such as wheat. The stubble should be ploughed as soon as possible after harvest and left rough until spring, thus the greatest amount of weathering, which is so essential to a good tilth. is secured. In the spring very thorough working should be given in order to obtain the best possible seed bed, as the subsequent plant depends in most cases directly upon the fineness of the seed bed. These operations all tend to expose the wireworms to rooks, jackdaws, starlings and plovers. Hoeing between the rows should be done as often as labour and horses are available, especially during the early stages of the crops and on into June and July. Since the wireworms suffer greatly from lack of moisture, the drier the soil mulch is, the better. In the case of autumn cauliflower and spring cabbage, which usually follow early potatoes, the risk of wireworm attack is small, but nevertheless interculture is strongly recommended.

Superphosphate applied in the drills for roots frequently gives good results in warding off attacks, but with cabbage and cauliflower as field crops the use of nitrate of soda as a stimulant appears to be the most promising.

The work on poisoned baits which is being conducted at the Pathological Laboratories of the Ministry of Agriculture is interesting in that the results obtained (9) so far show the value of poisoned dressings for surface larvæ. It is possible that, as rape is known to be an attractant to wireworms, a dressing of rape dust to which lead arsenate has been added might give good results in destroying wireworms, and might be worthy of a trial on badly infested fields. In the majority of cases the use of proprietory soil insecticides is to be discouraged; for in many cases which have been recorded the results of their use have been most disappointing.

In small gardens and allotments, trapping by means of potatoes stuck on sticks and pushed into the ground is probably the most effective way of dealing with the pest. The traps should be frequently examined and the wireworms removed and destroyed.

THE TURNIP MUD BEETLE (*Helophorus rugosus*, Ol).

This insect, though well known in Scotland and on the continent, is only seldom reported as doing serious damage to turnips in this country. In 1913 the Board of Agriculture recorded (4) the presence of this pest, in 1921 it was reported (22) as occurring in Cambridgeshire, and in 1923 an outbreak was notified from Lincolnshire.

Life History. The turnip mud beetle (Fig. 2) is oblong in shape and about 5 or 6 mm. in length. The head is reddish, the thorax is darker than the head, edged with brown and strongly ridged; the elytra or wing cases are brownish with darker markings and closely punctured, and running longitudinally over them are numerous distinct ridges; the legs are yellowish brown and rather long and slender, and the undersurface of the body is covered with fine silky hairs. The beetles are usually found in damp situations, such as the edges of ponds, but they are by no means confined to such localities. Fowler (10), referring to the distribution of this species, states that it is rather local, but widely distributed throughout England and Wales, both inland and near the sea coast.

The larvæ of the mud beetle are mottled, having darkish spots about the body segments; they are entirely clothed with short, stoutish hairs and have six short, jointed legs. When they have attained full development they measure about 7 mm. in length and leave the plant on which they have been feeding to pupate in the soil.

Both adult beetles and larvæ damage the turnip crop and are usually found feeding amongst the bases of the leaves; the young leaves, however, may be attacked, the leaf stalks may be gnawed or tunnelled, and, in some cases, the roots may be tunnelled or completely eaten off in young plants.

Control.—Very little control work has been done on this species, and, until it has been systematically studied and control measures adapted, it is probable that the best methods for preventing serious loss would be growing turnips as far as possible from those areas known to be infested with the beetle, stimulating attacked crops with artificial manures and working the land thoroughly after the removal of an infested crop.

FLEA BEETLES (*Phyllotreta nemorum*, L.; *P. undulata*, Kuts; *P. Cruciferæ*, Goeze).

Several species of flea beetles infest cruciferous crops and do considerable damage, for they attack the seedling when the destruction of the seed-leaves, or cotyledons, generally means death to the plant. The most important species of these beetles are *Phyllotreta nemorum*, *Phyllotreta undulata* and *Phyllotreta cruciferæ*. They are small shining beetles about one tenth of an inch in length, very alert, and characterised by having the posterior pair of thighs, or femora, much enlarged. It is by means of the well-developed, muscular hind legs that the beetles are able to hop a considerable distance at the first sign of alarm. *P. cruciferæ* (Fig. 3A) is usually referred to as the " cabbage flea " and may be distinguished from the other two species since it is dark, with a blue or greenish sheen, while both *P. undulata* and *P. nemorum* have a yellow stripe down each elytron or wing cover (Fig. 3B.).

Life History and Habits.—The flea beetles spend the winter in coarse herbage in hedge bottoms or ditch sides, amongst stubble or crop remains, in dead leaves and under the bark of trees. Early in spring, as soon as the temperature rises and the sun's warmth reaches them, the beetles leave their winter quarters and may be seen sunning themselves on grass or herbage. They feed on the young leaves of cruciferous weeds: shepherd's purse, charlock, garlic, mustard, and wild cresses: and, in the absence of a turnip or cabbage crop, will breed on these host plants. As soon as turnip or cabbage seedlings are available, however, they migrate to them for food, gnawing holes in the cotyledons. It is probable that the majority of eggs are laid in June on the ground near the plants ($_{31}$). About eight days after oviposition the eggs hatch and minute, pale yellow grubs emerge. In the case of *P. nemorum* the larvæ make their way up the stem and burrow into the leaves, feeding on the internal leaf tissue and leaving the upper and lower surfaces intact. These turn brown and dry, and a tortuous track may be seen in the leaf. This larva is whitish in colour, has a large distinct black or brown head, six short legs, and is sparsely covered with hairs. The larvæ of *P. undulata* appear to spend their lives underground among the roots. The cabbage flea, *P. cruciferæ*, is said to lay its eggs on the undersurface of the leaves, and the resulting larvæ do not tunnel as in the case of the turnip flea, but feed openly upon the cotyledons.

When fully fed, and measuring about one sixth of an inch in length the larvæ of these flea beetles pupate in the soil. The pupæ are soft, whitish bodies which gradually darken as they develop. If the pupa is examined with the aid of a lens the limbs, wings, and eyes of the transforming insect can be seen. The pupæ remain quiescent in the soil for about a fortnight, after which time the pupal coats split and the adult beetles emerge. There are several broods per annum.

The damage done by the larvæ of the flea beetles is of secondary importance only ; the real loss to growers being caused by the adult insects. These attack the seed leaves before the plant is firmly established and, in dry seasons particularly, wilting occurs rapidly, and ultimately the seedling dies. Frequently the damage done is excessive and several seedings are necessary before a satisfactory plant is obtained, thus the cost of producing the crop is substantially increased.

Control measures.—Control measures usually take the form of :—

1.—Repellent dressings on the seed.
2.—Use of deterrents.
3.—Spray treatments.
4.—Trapping the beetles by mechanical devices.
5.—Stimulating the seedlings.

Dressing the seed with deterrents.—It has been found that steeping the seed in paraffin and then drying sufficiently to drill, and sprinkling the seed with turpentine prior to drilling, have proved fairly satisfactory.

Use of Deterrents.—Sand which has been soaked in paraffin may be sown among the seedlings as soon as they show above ground. As the smell of paraffin is distasteful to the beetles, attacks may be successfully warded off in this manner. Roebuck (26) suggests the use of sacks soaked in paraffin, these to be dragged over the fields when the crop is through.

Deterrents may be applied directly to the seedlings. Theobald (36) recommends broadcasting over the plants a mixture of equal parts of soot, lime and road dust, early in the morning when the dew is on the leaf. The old time practice of driving sheep over the fields in the early morning in order to raise a cloud of dust, some of which was retained on the leaves has been said to yield most satisfactory results. This indicates that dusting with powder sprays might prove of use, but where plants were dusted (20) with precipitated sulphur in bright sunshine no deterrent effect was produced.

Use of Sprays.—Since the beetles feed on the leaf tissue, effective control should be obtained by thoroughly covering the seedlings with a poison spray. Two sprays appear to give satisfaction, paraffin emulsion and lead arsenate. In 1920 paraffin emulsion proved effective in Berkshire and gave good results in Hampshire in 1921 (22). A formula for paraffin emulsion is :—

Soft soap	2lbs.
Paraffin	1 quart.
Soft water	10 gallons.

The soap should be dissolved in hot water and the paraffin poured in ; these syringed until a good emulsion is obtained, then the remainder of the water added.

The lead arsenate spray is made as follows :—

Lead arsenate paste	4lbs.
Soft water	100 gallons.

Sufficient soap to ensure good wetting.

The wetting power of the spray can be tested by dipping a cabbage leaf : if the solution does not adhere to the leaf more soap must be added.

Trapping the Beetles.—This method of control is based on the fact that when disturbed, even by a shadow falling on it, the beetle hops upwards and forwards. Most satisfactory results have been obtained by mounting boards, smeared on the underside with tar, wet paint, banding grease, or other sticky substances, on light wheels. The boards are arranged so as to be directly above the plants and the implement is wheeled up and down the rows. On being disturbed the beetles hop off the plants, strike the boards, and are retained by the adhesive surface.

Stimulating the Crop.—The use of superphosphate drilled with the seed and a top dressing of quick-acting nitrogenous manure is efficacious in encouraging rapid growth, and thus the loss due to insect attack is considerably diminished. It is most important to sow the seed in a well prepared bed, the finer the tilth the better for the seedling, since there is less shelter for the beetles beneath or about the clods of earth. Miss Ormerod (23) calls attention to the fact that in the field attacks were less serious where seed was sown in a stale furrow.

Cruciferous weeds should be eradicated as far as possible as they afford food and breeding places for the insects, and all refuse and crop residues which might provide winter shelter should be burnt, preferably in October, when any insects which have selected such sites for winter quarters will be destroyed.

THE CABBAGE STEM FLEA BEETLE (*Psylliodes chrysocephala*, Latr.).

This flea beetle is fairly widely distributed and in 1920 and 1921 was reported (22) from Cornwall, Surrey and Norfolk.

Life History.—The beetles, which are about 3 mm. long, are bright metallic green or greenish blue in colour, with conspicuous yellowish legs. Like the flea beetles already dealt with, the thighs of the hind pair of legs are much enlarged and by means of these the beetles can jump a considerable distance. Their general shape is oval; the head bears long, slender head feelers and is practically hidden under the pro-thorax. These beetles hibernate in the hollow stems of weeds, in stubble, under the bark of trees and posts, in rough herbage, in hedge bottoms and similar places, and with the coming of spring leave their shelters to feed on cruciferous plants. They lay their small whitish eggs on or near the food plants and the larvæ, on hatching, tunnel into the stems, often completely destroying the interior. When mature the grubs leave the plants and pupate in the soil. There are several generations per annum, and these overlap, consequently adult beetles can be found from spring until late autumn, often in company with the mustard beetle, both on food plants and in mustard stubble.

Control.—Some of the measures, especially those dealing with repellent dressings, indicated for the turnip flea beetles, might be employed advantageously for the control of this beetle. The necessity for keeping down cruciferous weeds cannot be too strongly emphasised and in connexion with the flea beetles is especially important.

THE MUSTARD BEETLES (*Phaedon cochleariæ*, Fab.; *Phaedon armoraciæ*, Linn.).

Mustard and turnips, especially where grown for seed, are very liable to the attacks of the mustard beetles: small, shining, blue beetles, whose life cycle is extremely short and which increase so rapidly that myriads may be seen in the mustard fields at harvest time, pattering down like rain when the crop is struck with a stick. In the fen district this pest is particularly numerous and in isolated areas has been recorded (25) as attacking and practically destroying beds of watercress.

Life History.—Leaving their winter quarters in spring, the beetles, which are from 3-4 mm. in length, oval in shape, and blue or blue-green in colour, seek out cruciferous plants and commence feeding on them, eating out small irregular areas, usually from the under surfaces of the leaves. Eggs are laid in shallow depressions in the leaf surface, often near the edges of damaged areas along the veins or mid-rib, or in the leaf stalks of young plants, the female biting out with her jaws suitable locations in the tissue to receive her eggs. These are pale at first, but later become orange in colour;

they measure about 1 mm. in length and hatch in from six to eight days, depending on weather conditions. The young grubs have black heads, black and yellow legs, and a dark pro-thorax; the body tapers towards the tail and is dark yellowish, with several rows of black spots from which stoutish bristles arise. Feeding in close proximity, the grubs destroy the lower tissue of the leaves leaving the upper epidermis, which turns brown and semi-transparent, intact. The duration of the larval stage is variable and may extend to three weeks. When full grown the grub (Fig. 4) measures about 6 mm. long; it is stout and fleshy, with a large black head and rows of distinct, smoky tubercles on its olive green body; of these the lateral tubercles are most prominent and, on being disturbed, the insect may protrude yellow glands from them. Pupation takes place in the soil, the grubs burrowing to a depth varying from 1 to 1½ inches. In some cases pupal cells are fashioned of soil particles, but in others the larval coat is shed and the pupa remains without any surrounding soil cocoon. The pupa is deep yellow and clothed with stout brownish bristles; the pupal stage is from a week to a fortnight, towards the end of which period the insect begins to darken about the eyes and the extremities of the limbs. At emergence the pupal coat splits from the head down the back permitting the pale, delicate insect to escape; gradually the exoskeleton hardens and assumes its normal bright colour (Fig. 4).

There are several overlapping broods of mustard beetles per annum and throughout the summer it is not unusual to find both beetles and grubs feeding on the same plant. They attack swedes, turnips, cabbage, mustard, radish and horse-radish, and various weeds, including charlock and wild radish; in some seasons young crucifers are attacked in the seed beds and serious loss incurred; usually, however, the seed crops suffer most, both larvæ and adults feeding voraciously on these plants, the adults frequently attacking the developing seed pods and doing a considerable amount of damage.

Towards the end of summer the beetles seek places suitable for hibernation. When seed crops have been attacked they usually shelter in the stubble of which there is a considerable length, as shown in the accompanying photograph (Fig. 5); large numbers of the beetles crawl into the hollow stems, generally from five to twelve together, and from counts made in 1923 the writer estimated as many as 100,000 per acre may hibernate in this manner. The photograph (Fig. 6) shows some of these stems split open and the beetles within. Other winter quarters include hollow stems of reeds, coarse grasses, weeds and the like; and under the bark of old trees and posts and the thatch of stacks, sheds and houses seem to be favourite resorts. It is quite common to see these beetles migrating in a continuous stream from crop to crop or to winter quarters, for though the beetle has wings it does not, apparently, use them to any great extent.

Control.—Of the insects attacking the mustard beetles little is known, but the writer has found a Tachinid fly, *Meigenia floralis*, Fln., parasitising them, and it is probable that further study will reveal other insects which assist in keeping the beetles in check.

Various control measures have been recommended for the mustard beetles and a consideration of the life history and habits indicates that the following would be likely to yield beneficial results.

Burning the Stubble.—The beetles have usually taken up their winter quarters in the stubble by the middle of October; if, after that date, the stubble be cut, raked into heaps and burnt many hibernating beetles will be destroyed.

Hedge sides and Dyke sides.—These should be cut down close to the ground so as to afford as little shelter for the beetles as possible in winter and little harbourage in summer; cruciferous weeds about headlands should be kept down.

Good Cultural Methods should be adopted.—These include preparation of good seed beds, seeding early and dressing with superphosphate at seeding. It is often advisable to stimulate the crops with a top dressing of nitrate of soda or sulphate of ammonia.

Spray Treatment.—Where a young crop is heavily infested with the beetles and their grubs spraying with lead arsenate is advisable (p. 54).

THE POLLEN BEETLE (*Meligethes aeneus*, Fab.).

This small beetle is particularly injurious to cruciferous crops grown for seed. In certain areas where such crops are largely cultivated, as in the Lincolnshire Fens and the Romany Marsh, it frequently does serious damage, injuring the flowers and considerably reducing the yield of seed. In 1922 an epidemic occurred in Lincolnshire and scarcely a crop could be found which was not heavily infested with these beetles. Mustard, both brown and white, seems to suffer more from this pest than swedes and turnips, probably because of the later date of flowering.

Life History.—The adult beetle (Fig. 7) which is about 2 mm. in length, is oblong oval in shape and of a deep, shining green colour. It deposits its eggs about the opening blossom; the eggs are whitish with a trace of pink, elliptical in shape and from ·6 to ·7 mm. long. They hatch in from seven to ten days and small, whitish yellow grubs make their appearance. The grubs have black, somewhat bristly heads, bodies with a sooty patch near the head and which taper towards the tail where there is an anal proleg, and three pairs of whitish legs, black at the tips. They feed on the internal parts of the flower, and where they are numerous their depredations result in the brown and withered appearance of the flower. When fully fed the larvæ, which then measure about 3 mm. in length, leave the food plant and pupate in small earthen cocoons in the soil about the roots of the plant. The pupal stage lasts from a fortnight to three weeks. Since several overlapping broods occur the various stages can be found throughout the latter part of the summer. According to a Russian writer (2) the beetles pass the winter in the adult stage hibernating in the soil.

Control. -Various methods have been adopted in England to control this pest, but so far no great success has been attained. The beetle is very troublesome on the Continent, and the following is a summary (1) of the methods employed in some of the countries there.

Germany.—(1) Ante-dating sowing by fourteen days: this promotes early flowering and the injury is less serious; (2) Forcing the plants in the early stages to encourage early maturing. It was noticed in Germany that warmth and sunshine promoted the growth of the plants and discouraged attack by insects. A parasite, *Diospilus oleraceus*, was noted as checking the pest.

Finland.—Spraying with arsenate of lead at the first appearance of the beetle was found satisfactory.

Austria.—(1) Deep ploughing as soon as possible after harvesting is advisable; (2) A good seed bed should be obtained and the soil worked to a fine tilth; (3) Boys sent among the plants with damp nets; the heads are shaken into these to collect the beetles, which are afterwards destroyed by being dipped into boiling water.

Russia.- (1) Good cultivation to give the plants every opportunity for vigorous growth; (2) Spraying with arsenate of lead.

THE TURNIP GALL WEEVIL (*Ceuthorrhynchus pleurostigma*, Marsh.)

Each year the turnip gall weevil causes serious damage in some locality, and its presence is indicated by the deformed bulbs of turnips and swedes and the stunted growth of cabbage, mustard and rape. If a field of turnips or swedes is examined some galled plants are sure to be found; but as Theobald (34) points out, "It is not so much the deformed, galled, necessarily stunted growth of the turnip or swede that is, however, of such vital importance; it is the too frequent attack on young plants, when all future growth is stopped by these maggots, that makes the turnip gall weevil of such importance to the farmer." In market gardens and private gardens too, serious loss follows an attack by these weevils, for infested cabbages and savoys often fail to heart and may flower prematurely, and crops of broccoli are frequently rendered valueless by their depredations.

Life History.—The weevil is a small snout beetle, measuring about 3 mm. long. The upper surface is black with here and there a few greyish scales, and the undersurface is entirely clothed with greyish or silvery scales. The head is prolonged into a snout, or rostrum, on which the elbowed headfeelers are borne. The thorax, which has a central groove, and two lateral tubercles, is coarsely punctured. The legs are rather slender, black in colour, and bear stoutish teeth on the femora or thighs. The weevils may be found throughout the spring and summer feeding on the flowers and any young, succulent growth of cruciferous plants.

The eggs are laid singly in the stems and roots. The female crawls down the stem of the plant and in it, below the surface of the soil, bores a hole with her long snout; into this the egg is directed by means of the ovipositor and sealed by a gummy secretion. Several eggs may be found on one plant. When laid the eggs are nearly transparent, but when about to hatch become much denser. The duration of the egg stage varies with the season, but in summer hatching takes place in from five to seven days.

When the egg hatches minute, whitish grubs emerge. These begin feeding on the tissue of the plants, and the irritation results in the formation of gradually enlarging galls. In the centre of the gall the larva lives and feeds, boring shallow holes into the tissue in various directions. The grubs, which measure about ¼ inch at maturity, lie in a curved position in the galls. They are wrinkled into numerous folds and sparsely covered with short hairs or bristles which facilitate movement. The head is proportionately small and very pale brown; it bears two strong, pointed jaws, with distinct dark brown tips. In summer time the larval life may be completed in about four weeks, but as winter approaches the period extends.

When fully fed the larvæ bite their way out of the gall, and, entering the soil, construct small earthen cocoons in which they pupate. The quiescent pupæ are at first whitish, and through the outer skin the outlines of the developing adult insect can be seen. Towards the end of the pupal period the colour becomes darker, the eyes develop and become distinguishable, and through the pupal coat many of the limb joints can be discerned. Finally the pupal coat splits and the perfect insect emerges, ultimately appearing above ground as a black and greyish weevil (Fig. 8).

Control Measures.—The most recent work on the control of the gall weevil has been done by Isaac (14), who made trials with various soil fumigants · naphthaline, dichlorbenzene, active creosote, etc., but these proved unsuccessful. He next tried immersing the roots of seedlings in hot water, but a temperature high enough to destroy the larvæ also prevented the plants from growing when planted out.

Until further work has been done, therefore, the most satisfactory measures to check the pest are those in keeping with hygienic culture. Destruction of the stumps of cabbage, cauliflower and the like by burning, has been advocated, but this is a most difficult proceeding and it is probable that pulling the stumps, leaving them on the ground and running poultry over the area would yield beneficial results. In Somerset in 1922 it was noticed, as stated elsewhere (19) that, where stumps were pulled and left exposed, blackbirds and thrushes pecked open many galls and destroyed the enclosed grubs. Some authorities advocate the application of soot and lime as deterrents, but it is doubtful if any real benefits accrues from the use of these. In Lincolnshire the beds of spring cabbage are often infested by the weevils and under such circumstances galled seedlings are rejected for purposes of planting out. Fig. 9 shows examples of galled plants which were rejected. Where selection in this manner has been carefully carried out, the resulting crop is not usually affected to any great extent. Wide rotation should be adopted where possible so that crops liable to attack may be grown far apart in the rotation. Cruciferous weeds should be kept down since the gall weevil readily attacks these and by this means may persist until another cruciferous crop be grown.

THE TURNIP SEED WEEVIL (*Ceuthorrhynchus assimilis*, Payk.).

This insect, which was noted by Curtis (8) in 1841, is frequently of considerable importance in localities where turnips, swedes and cabbages are grown for seed, for the grubs feed inside the seed vessels, destroying the seeds and thus causing serious loss to the grower.

Life History.—The weevils lay their eggs in holes bored in the developing seed vessels by means of their long snouts. These eggs hatch and the minute, white larvæ eat their way into the pods and destroy the seeds. The larvæ are without legs and have glossy brownish heads with darker jaws; they are usually found lying in curved position in the pods, and the segmentation of their bodies gives them a wrinkled appearance. About the middle of July, when the grubs are fully fed, they gnaw their way out of the seed vessels leaving characteristic circular exit holes. Escaping from the pods they fall to the ground, where they burrow to a depth of 1½-2 inches and then construct small earthen cocoons in which they pupate. The pupal stage lasts for about three weeks and at the end of this period the adult weevils emerge from the ground.

The turnip seed weevil (Fig. 10) is from 3-4 mm. in length, black in colour with pale hairs above and whitish scales below, making it appear greyish. The thorax and elytra are rather corasely punctured ; the thighs are stout, and, together with the rostrum, antennæ and limbs, are folded close to the body at the least indication of alarm. These weevils feed among the flowers of cruciferous plants in company with the turnip gall weevils and a smaller species, *Ceuthorrhynchus contractus*, Marsh. the larvæ of which occasionally damage seedling crucifers. Theobald (35) states that there are at least two broods of turnip seed weevil annually and that the latter brood hibernates, reappearing in spring, when they can be seen feeding on the flowering shoots of mustard, cabbage, turnips, rape and charlock.

Control Measures.—Very little work has been done on the seed crop pests, and for the seed weevil little which would be of material benefit can be suggested. Destruction of cruciferous weeds is always advisable and dressing the crop with artificials in order to secure increased yields would appear good practice.

THE TURNIP SAWFLY (*Athalia spinarum*, Fab.).

Among the pests which attract general attention by occasionally occurring in epidemic form the turnip sawfly is probably one of the best known. Outbreaks have occurred periodically in this country since 1756, when, according to Curtis (8) the appearance of the insect was first recorded. Attacks seem to have been most serious in the eastern and southern counties of England, though Miss Ormerod (23) records a slight attack at Sedbury Park in West Gloucestershire.

Life History.—The adult sawflies appear in May and June and deposit their eggs in incisions along the edges of turnip leaves, cut by means of the highly specialised saw-like ovipositors, from which their name is derived. After a few days these eggs hatch and small whitish larvæ make their appearance ; they feed on the leaf tissue and their bodies gradually become a pale greenish colour and their heads black. The caterpillars have three pairs of true legs and eight pairs of sucker-like pro-legs ; at this stage they are able to spin fine silken threads by means of which, when disturbed, they lower themselves from the leaves and later regain their position. As they increase in size they lose this power of spinning and assume a slaty grey colour above and pale yellowish beneath. When fully fed and measuring about 17mm. in length, the larvæ leave the plants and enter the soil, there spinning silken cocoons in which to pupate. The late summer brood remains in the soil until the following spring, when the adults emerge.

The sawflies are orange-yellow in colour, and have the head, parts of the thorax, and the legs black. The delicately veined wings are yellow at the base and have the anterior margins of the fore-wings slightly stouter and dark in colour. The plants on which they deposit their eggs include turnips, swedes, and certain cruciferous weeds; the resultant caterpillars, when present in numbers, soon defoliate considerable areas, eating the entire leaf tissue and leaving only the stouter veins hanging to the mid-rib.

Control.—Birds and insects both assist in keeping this pest in check; among the former rooks may be mentioned as destroying the larvæ, and swallows as taking large numbers of the adult sawflies. Of the insects which parasitise the larvæ, one in particular is well known, a Tachinid fly, *Meigenia bisignata*, Meig.

As in the case of most insects which occur in periodic epidemics, the turnip sawfly only occasionally calls for special control measures. These would take the form of spraying with lead arsenate paste and deep ploughing after the removal of the crop: this latter aims at burying the over-wintering pupæ and thus rendering emergence difficult. In cases where slight attacks occur poultry allowed a free range over infested areas would soon reduce the number of larvæ.

THE CABBAGE BUTTERFLIES (*Pieris brassicæ*, Linn.; *Pieris rapæ*, Linn.; *Pieris napi*, Linn.).

The caterpillars of the cabbage butterflies are among the most destructive of the insect pests of crucifers for they frequently devour whole leaves until only a few thick veins remain; they may also be found attacking mustard, rape, turnip and allied plants, and have been reported as feeding on the seed vessels of turnip and swede seed crops.

Life History.—"*Large White*" *Cabbage Butterfly* (*Pieris brassica*) —This butterfly, as its name implies, is larger than the two other species, having a wing expanse of about three inches, while that of the others is about two inches, and it may be seen in gardens, fields and along roadsides from April to October. The fore wings, on the upper surface, are white with a broad, somewhat crescent shaped, black patch at the tip, a dark patch near the lower edge and two large black spots near the centre; on the lower side the wings are white with yellowish tips, and have two black spots near the middle. The hind wings are white above with a black patch on the upper edge, and underneath they are pale yellow with black markings. The male of this species can be distinguished from the female by the absence of the two black spots near the centre of the fore wings.

The eggs are laid in clusters varying from about twenty to sixty or more eggs, and are found on the backs of leaves of cruciferous plants. They are yellow in colour, deeply furrowed longitudinally and reticulate; they may be seen throughout the period May to September. The duration of the egg stage varies, dependent probably on weather conditions.

Immediately on hatching the young larvæ proceed to devour the egg-shells; they are very small and greenish or brownish green in colour, but as the moults take place their appearance gradually changes. Curtis (8) describes the full grown larvæ as follows:—"..... They attain the length of 1½ inches and are as thick as a small goose quill; they are then pale blue or greenish above, yellow beneath, with a line of the same colour down the back, edged with black dots; there is likewise a row of large black spots down each side and numerous minute dots, as well as fine hairs, scattered over the body." When newly hatched the colony of larvæ feed *en masse*, rapidly eating large holes in the leaf, but as development continues they disperse over the plant.

When ready to pupate the larvæ leave the plants on which they have been feeding and wander to some sheltered place—in crevices of old walls, about fences and palings, branches of trees or hedges—and there attach themselves by the tail and round the body by strong silken threads. The chrysalis of this species is of a colour varying from pale green to greyish green and is spotted with black. In the case of the early broods the pupal stage lasts about a fortnight, but the chrysalids formed during the autumn remain until the following spring, defying cold and storms; with the spring sunshine, however, the pupal coat splits down the back and the perfect insect emerges.

The "Small White" Cabbage Butterfly (*Pieris rapæ*).—The female of this species closely resembles that of the large white cabbage butterfly, but the wing expanse is considerably smaller, measuring only rather more than two inches, and the tips of the fore wings are less decidedly black, frequently greyish, and less regular in outline. The male is characterised by fore-wings with one black spot in the centre. The forewings of both male and female are white on the underside with a yellow area at the tip and two black spots near the centre. The hind wings are cream with a distinct black patch near the upper edge; beneath they are yellowish and mottled with black.

The eggs of the small white cabbage butterfly, while similar in colour and shape to those of the larger species, are more difficult to find because they are always laid singly on the backs of leaves. The caterpillars hatching from these eggs are, however, totally different from those of *P. brassicæ*; they are green and covered with a dense pubescence which gives them a velvety appearance; they have a yellow stripe along the back and either a stripe or row of yellow spots down each side; the undersurface of the caterpillar is of a paler green than the upper surface. When fully fed (Fig. 11) they measure rather more than an inch in length, and leaving the food plant, find shelter in palings, fences, walls, etc., where they change to chrysalids of a pinkish-brown or brownish-green, spotted with black.

The Green-Veined Cabbage White (*Pieris napi*).—This species is similar in size to the small white butterfly. The fore wings are white, tipped with powdery black patches and netted with greyish veins on the upper surface, the female having darker wing markings than the male and two black spots near the centre of each; beneath the wings are white, with distinct dark veining, yellow at the tip and with two black spots near the middle. The posterior wings are white on the top and have a black patch at the upper margin; the venation of these wings is very clearly marked, the veins forming greyish stripes; the undersurface is yellow and here the dark veins have green margins, the characteristic from which the insect derives its name.

The eggs of this butterfly are laid singly on the backs of leaves; they resemble those of the other species in size and shape, but are whitish in colour. The caterpillars are a dull, velvety green, densely covered with hairs and having a row of red or reddish yellow spiracles or breathing pores along each side. The colour of this caterpillar harmonises so well with its surroundings that during the day, when lying along the leaves, it is scarcely discernable. The chrysalids resemble those of the other species in shape and general appearance, and are found in similar places, suspended in the same manner; they are, however, of a pale greenish white or yellowish green colour, mottled with black and having brown extremities.

Control Measures.—Several natural factors influence the prevalence of the cabbage butterflies. The butterflies appear most numerous and their caterpillars do most damage in hot dry seasons. Heavy rains which saturate the foliage indirectly cause the death of many larvæ. Several species of Ichneumon flies parasitise the caterpillars; these include *Microgaster glomeratus* and *Pteromalus brassicæ,* small active insects which lay their eggs in or on the caterpillars. These give rise to maggots, which pass their lives inside the host and are not revealed until "a large number of small white maggots are found emerging through the skin of a cabbage butterfly caterpillar to spin a bunch of white or yellowish cocoons on the leaf near by, from each of which will emerge in due course a small black Ichneumon (Braconid)." (21).

Generally speaking serious outbreaks of the cabbage caterpillars occur where plenty of shelter is afforded for the passing of the pupal stage; thus near old walls, buildings, fences, habitations and the like numbers of caterpillars frequently occur, whereas out in the open, where cabbage and cauliflower are grown on a field scale, little damage is done. One instance came to the writer's notice: a serious outbreak in a private garden surrounded by high walls, while crops only a little distance away were unattacked. Attention should therefore be paid to sites which might afford winter shelter, and where an outbreak has occurred it would be advisable to brush down the walls, etc., with a broom to dislodge any sheltering chrysalids.

In allotments and small gardens hand picking the caterpillars offers the easiest method of control. Watering the plants with salt and water has been suggested and spraying with lead arsenate as for the diamond-back moth could be adopted where young plants are attacked on larger areas.

THE CABBAGE MOTH (*Mamestra brassicæ,* Linn.).

In some seasons the larvæ of this moth are a particularly serious pest, and, while by no means confining their attacks to cruciferous crops, they are most commonly associated with them. Curtis (8), referring to the pest, states: "The cabbage is the favourite, or rather, the most usual food of these animals," but they may attack a great variety of plants, including rape, turnips, radishes, strawberries, lettuce, marigolds and geraniums: in fact few plants are immune. In 1917 the caterpillars of the cabbage moth were most common in the West of England, in one case doing serious damage to a crop of mangels.

Life History.—"The moth," as described by Theobald (33), "has dark grey fore wings varied with black, having many blackish streaks upon the costal edge, a large ear-shaped spot margined with

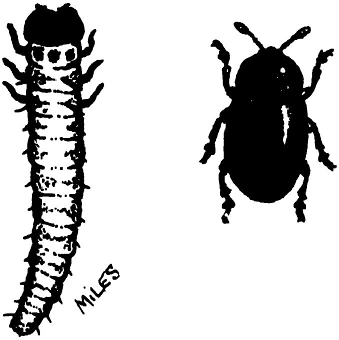

Fig. 7. Pollen Beetle, *Meligethes Sp.* (× 13), and Young Larva (× 25).

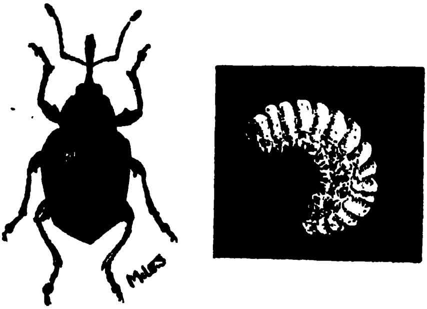

Fig. 8. Turnip Gall Weevil (× 10), and Larva (× 10).

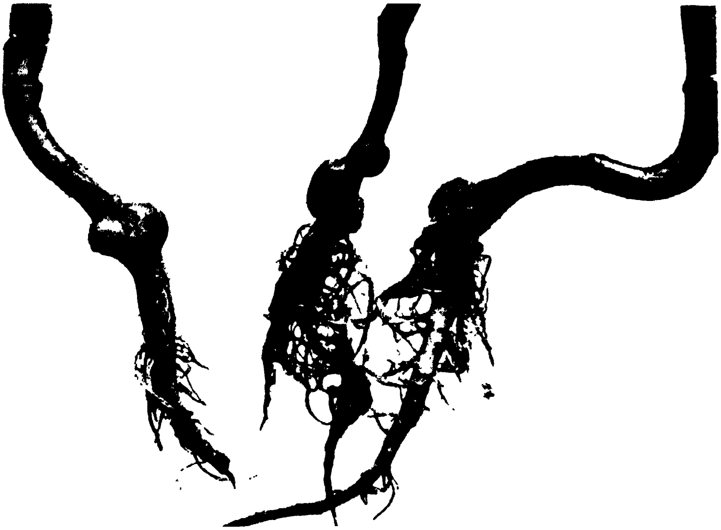

FIG. 9. GALLS ON YOUNG CABBAGE PLANTS CAUSED BY TURNIP GALL WEEVIL (Natural size). (*Photo. H.W.M.*).

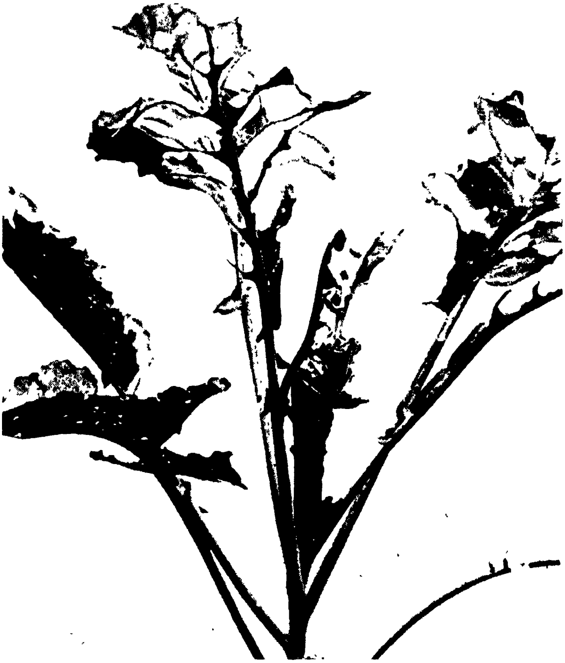

FIG. 11. YOUNG CAULIFLOWER PLANT ATTACKED BY CATERPILLARS OF SMALL WHITE CABBAGE BUTTERFLY. CATERPILLARS *in situ*. SHOT HOLES ON LEAVES AT RIGHT CAUSED BY LARVÆ OF DIAMOND-BACK MOTH. HALF NATURAL SIZE. (*Photo. H.W.M.*).

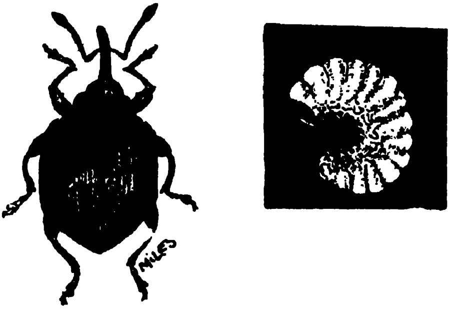

Fig. 10. Turnip Seed Weevil (× 9), and Larva (× 8).

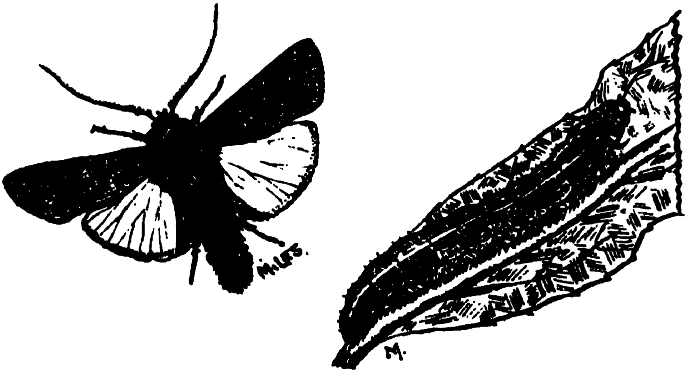

Fig. 12. Turnip Moth and Cutworm. Approx. Nat. Size.

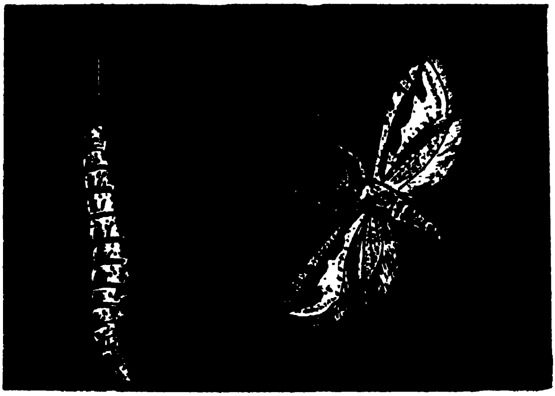

FIG. 13. DIAMOND-BACK MOTH AND LARVA (× 3).

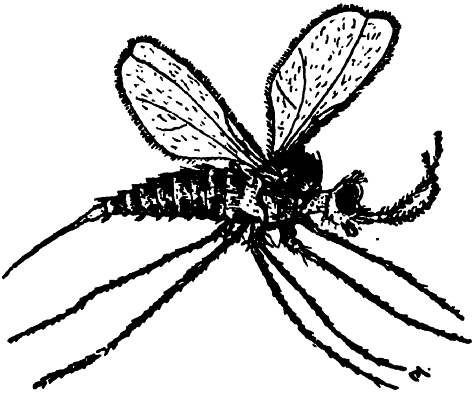

FIG. 14. SWEDE MIDGE (much magnified).

white and surrounded by a dark line ; the ends of the wings are festooned with black, and along this runs a sinuous white line, two more or less distinct circles between the white spots and the base of the wings ; the hind wings are brown, pale at the base and have a whitish fringe ; thorax the same colour as the fore wings ; the abdomen brown with more or less distinct tufts down the back, the apex is distinctly tufted : the legs are brown and very hairy at the base, the tarsi with ochreous bands. The wing expanse reaches about one and three fourths of an inch." During the daytime the moths are usually inactive and rest on trees, walls and palings, in rubbish and undergrowth, but towards evening they become active and flutter about among the vegetables, laying their eggs upon the leaves. These eggs hatch in from six to seven days and the greenish caterpillars with brown or yellow heads immediately begin feeding on the leaf tissue ; as they grow the caterpillars become darker in colour and vary considerably, some being dull greenish with dark dorsal bands, others almost black above, and others with pinkish or yellowish tinges below. They measure about one and a quarter inches at maturity, cease feeding and burrow into the soil and there change into a chestnut brown pupæ in which state they remain until the following spring ; in mild winters, however, some of these caterpillars may be found feeding ; these pupate in the spring and emerge towards midsummer.

The pest is widespread in distribution and rarely a year passes but record is made of damage done by the caterpillar. In August the half-grown larvæ may be found in the centres of young cauliflower and summer cabbage ; they foul the plants and eat out large holes in the leaves and in plants which are " hearting up " they tunnel about among the compact mass, rendering the vegetables totally unfit for market. Where plants show penetrating holes about the centres and where the frass or excreta indicates the presence of the pest, the caterpillars may be found curled up in the hearts, under dead or drooping leaves or in the surface soil ; usually several are found together, secreting themselves by day and feeding voraciously under cover of darkness at night.

Control.—Where infestation of young plants in midsummer indicates the possibility of a serious attack developing, spraying with lead arsenate as for the diamond-back moth might be carried out, care being taken to force the spray well into the centres of the plants. When the plants have " hearted up " and only a few are attacked, those infested might be fed to pigs or poultry, both of which destroy the larvæ. After crops have been cleared numbers of pupæ are left behind in the soil and it is advisable to draw a poultry house to the field and allow the fowls free range over it, giving the land light harrowings from time to time to turn up the pupæ which the fowls eagerly devour.

SURFACE LARVÆ INJURIOUS TO CRUCIFERS.

The names "surface larvæ," so called on account of them living at or near the surface of the ground, and "cutworms" are applied to the caterpillars of three species of Agrotid moths; these are—

Agrotis pronuba, Linn. The yellow underwing moth.
A. exclamationis, Linn. The heart and dart moth.
A. segetum, Schiff. The turnip moth.

In some seasons these larvæ are widely distributed, and, appearing in vast numbers and attacking a variety of crops, do a considerable amount of damage; in other seasons they are few in number and the loss due to them is practically negligible or only locally serious.

Life History.—The yellow underwing is the largest of these three moths, having a wing expanse of two and a quarter inches. It has dark fore wings, either brown or grey, with sinuous mottlings and obscure figurings; the underwings, as the name implies, are bright yellow bordered with black bands; the body and legs are brownish and covered with down. The caterpillars vary in colour, some being brownish, others greyish green; they are usually paler along the sides and may have two more or less distinct, dark, irregular, dorsal lines; they measure up to 1¾ inches at maturity.

The heart and dart moth has a wing expanse of about 1½ inches; the general colour is brown, the rather narrow fore wings having transverse dark sinuous bands and peculiar markings which have been whimsically likened to a heart and dart—hence the name of the moth; the hind pair of wings are pearly white in the male and light brown in the female. The caterpillars, which at maturity attain a length of one and a half inches, are generally dull brownish grey in colour, some, however, are almost greenish with a tinge of pink; there are traces of a double dark line along the back and two others down each side, together with rows of distinct black spots.

The turnip moth (Fig. 12), sometimes known as the dart moth, is closely associated with the preceding which it greatly resembles. It is apt to be rather darker in colour, assuming a reddish brown or clay colour, but the markings on the wings are very similar to those of the heart and dart moth; the hind wings vary from whitish in the male to light brown in the female. The larvæ, which are somewhat flattened in this species, vary in colour from dirty grey to brownish; the upper surface is darker than the lower and banded like those of the preceding moth, but the spiracles or breathing pores along the sides are neither so dark in colour nor so distinct as those of the heart and dart caterpillars; each body segment has several more or less distinct black dots both on the back and just about the legs and prolegs.

The life histories of these moths are practically identical. The moths appear in June and July, the dart moth is usually the first to be seen and the yellow underwing is generally the last. The eggs are deposited in clusters on a variety of plants and active larvæ hatch from them in from ten days to a fortnight. For a short period they feed close together on the host plant, remaining quiescent during the day, usually in numbers, side by side on the undersurfaces of leaves. Later they spread to adjoining vegetation, feeding by night on the leaves and stems of plants and hiding by day in either the surface soil or dense undergrowth. When fully fed the caterpillars become brown pupæ in the soil.

The damage done by these larvæ varies with the crop attacked; the fleshy parts of turnips and swedes may be gnawed or tunnelled, and the leaves, in severe attacks, may be reduced to shreds; stems and lower leaves of cabbage suffer, the stems of spring cabbage often being completely severed; damage of this nature frequently occurs in mild winters, numbers of plants being destroyed as a result. Where food is plentiful and other conditions favourable, fully fed caterpillars may pupate in August and produce a brood of moth which oviposit the same season; the majority of caterpillars, however, go on feeding throughout the autumn and during the milder period of winter, pupating in spring and emerging in summer.

Control.—Birds are especially useful in keeping down the numbers of cutworms and where serious infestations occur rooks, jackdaws, starlings, peewits and gulls frequent the areas day after day until the stock of caterpillars is depleted. Thus, in Lincolnshire, where cutworms infest weedy potato fields flocks of gulls may be seen following the ploughs in search of caterpillars, and rooks and jackdaws behave in the same way in other parts of England.

Cutworms are also subject to the attacks of insect parasites, both Ichneumon and Tachinid flies destroying them in considerable numbers.

From time to time numerous methods have been suggested for controlling the cutworm pest, but the results have been too uncertain to recommend them for general application. Cultural methods are, however, important in this connexion and should aim at exposing the larvæ and pupæ to the attacks of birds and poultry. This is especially advisable where autumn cauliflowers or cabbage follow a crop of early potatoes; the latter frequently suffer from cutworm infestation, consequently the succeeding crop is often seriously attacked. Thorough surface working between the crops should, therefore, be aimed at; hoeing during the first few weeks after setting out cabbage plants is often beneficial. It should be remembered that weedy crops harbour cutworms and every effort should be made to keep down weeds from amongst the crop and on the headlands. Spraying with lead arsenate can be done where young root crops are attacked above ground.

The method widely and successfully employed in America is that of applying poisoned bait to the surface of the soil infested with cutworms. Various sweetening agents are used with poisoned bran as a basis but the work of Fryer and Stenton (9) has shown that poisoned bran alone is equally efficacious. In their trials both lead arsenate and Paris Green were used; the latter, which proved more effective, was mixed in the proportion of 3lbs. Paris Green to 56lbs. bran. The mixture was moistened with water until the particles of bran just failed to adhere to each other. The dressing was applied to the fields with a disc type manure distributor.

Owing to the possibility of poisoned bran proving a danger to poultry, game and other birds, and, through them, to man, it is doubtful whether this method will become general practice in this country; American authorities have, however, satisfied themselves that this difficulty is only an apparent one and the method has become popular on that continent, the only precautions urged being those connected with the mixing and handling of the bait. Further research on this subject may lead to the discovery of a poison which would destroy the larvæ without having any ill effects on birds and animals.

In 1921, when practically the whole of England was affected by serious cutworm attacks, the great value of poultry in combating the outbreak was realised, as the following extract (22) indicates:—
"In regard to remedies all observers were unanimous as to the great value of poultry. A special report from Kent (Theobald) states that fields were completely cleared of the pests by means of chickens—Rhode Island Reds appearaing to be the keenest hunters, with Leghorns next. In the case of mangold and broccoli fields the birds confined themselves to the caterpillars and did little, if any, damage to the crops."

THE DIAMOND-BACK MOTH (*Plutella maculipennis*, Curt.).

The diamond-back moth now and then becomes very destructive to crops of turnips, cabbage and swedes. The pest usually occurs in epidemic form, in some years committing serious devastation, and in others doing so little damage that its presence is scarcely noticeable. An attack by this insect is characterised by small round holes resembling shot holes appearing in the leaves of plants attacked (Fig. 13).

Life History. The damage is done by minute caterpillars, which hatch from small, yellowish eggs laid on the backs of the leaves of cruciferous plants. As soon as the caterpillars are hatched they eat small round holes in the leaves or else tunnel for a time in the interior of the leaf. At a later stage they feed quite openly on the backs of leaves, eating out irregular holes in the tissue, sometimes leaving the upper epidermis intact. When disturbed the caterpillars throw themselves off the plant on which they are feeding and hang by a fine silken thread, by means of which, when the danger is past, they regain their previous position on the leaves. The newly hatched larvæ are greyish in colour, but, as growth and development take place, they assume a pale green tint similar to that of the leaves on which they are found. This similarity was very noticeable in 1923, when, in the Holland division of Lincolnshire, they were found feeding among mustard flowers. The inflorescence was loosely spun together and the caterpillars were found lying along threads towards the inside of the flower head, where they were readily mistaken for the small green flower stalks.

As individuals the larvæ do little damage, being only about half an inch long when fully grown; but when they appear in large numbers, sixty or seventy to a young cauliflower, they become a serious pest. Miss Ormerod states that as many as two hundred and forty have been counted on a single plant of moderate size; consequently it can be readily imagined how great will be the damage done by a pest in such numbers feeding for a period of four or five weeks.

When fully fed the larvæ, which are characteristically spindle-shaped and have yellow or brownish heads, spin themselves delicate, silk-netted, whitish cocoons on the backs of leaves, on dead leaves, or on the ground. These cocoons are really silken tubes in which the insects pupate, leaving their cast skins outside adhering to one end of the network. The pupæ are at first pale yellow, but gradually become darker and mottled as development goes on. The pupal stage lasts for two or three weeks, at the end of which time the insects work their way out of the silken tubes, the pupal coats split and the perfect insects emerge.

The following is Theobald's (36) description of the adult :—" The moth has long, narrow wings, the fore pair being reddish—or slaty brown with a pale yellowish border posteriorly ; the hind wings are grey with long fringes of hair. a feature seen in all *Tineidæ.*" When the wings are folded the pale edges of the front ones come close together and form diamond-shaped areas. hence its popular name.

Control Measures.—Owing to the feeding habits of this pest it is a difficult one with which to cope ; but it can be satisfactorily controlled in gardens by spraying with lead arsenate so as to wet the under surfaces of the leaves. This can be done by using a syringe with an elbowed nozzle which directs the spray to the under sides of the leaves with least difficulty. The spray should be made up in the following proportions :—

Soft water	6 gallons.
Lead arsenate paste	¼lb.
Soft soap	½lb.

Another method is to brush the plants lightly with a bundle of twigs which causes the caterpillars to throw themselves off the plants ; the twigs are then drawn between the rows so as to break the silken cords and thus leave the caterpillars exposed on the surface of the soil where they can be sprayed with a paraffin emulsion made up of :—

Soft soap	½lb.
Paraffin	½ pint.
Soft water	4 gallons.

This spray is prepared as follows : Dissolve the soap in one gallon of the water, add the paraffin and syringe vigorously to get a good emulsion : now add the rest of the water stirring the mixture while doing so. It is most important to secure thorough emulsification before applying.

Since there are two broods of larvæ per annum, the second brood remaining as chrysalids among dead leaves, rubbish, etc. ; refuse which is likely to harbour these insects should be destroyed by burning ; and, because the larvæ feed on cruciferous weeds, these should be kept down in order to prevent the possibility of an attack originating with them.

THE TURNIP SEED MIDGE (*Cecidomyia brassicæ*, Wtz.).

This small gall fly is frequently very destructive to crops of turnips, swede and cabbage grown for seed, and Theobald (35) records an instance where he estimated that as many as sixty per cent. of the pods in one crop were ruined by the joint infestation of the seed midge and the turnip seed weevil.

Life History.—Theobald (*op. cit.*) describes the fly as follows :—"The adult fly is about one tenth of an inch long, with two transparent wings ; black with reddish abdomen, with dark bands ; the wings are limpid with dark veins and the balancers or halteres are rose-coloured at their base in fresh specimens ; the legs are dusky with pale, almost silvery hairs ; the female has a pale ovipositor which . . . . . is capable of being extended." These flies, which are on the wing in May and June, pierce the pods with their ovipositors and deposit their eggs inside. The eggs hatch and give rise to small, white, legless larvæ. Considerable numbers of these larvæ may be found in one pod, as many as fifty or sixty having been recorded. During July of 1923, in the Holland (Lincs.) district fifteen to twenty was the most usual infestation and the infested pods were much distorted, frequently twisted and curled from the attacked portion. Infested pods, easily recognisable by their distortion and premature yellowing, split longitudinally, allowing the mature, creamy coloured maggots to fall to the ground where they pupate. Apparently there are several over-lapping broods per annum, the final one passing the winter in the larval stage in the soil and pupating in early spring ; the adults from this brood appear in the late spring of the following year.

The damage done by the seed midge is two-fold, for it is not usual to find all the seeds in an infested pod devoured. Those remaining, however, are lost to the grower, for the premature splitting allows them to dry and they are shed before reaching maturity.

Control Measures.—These should take the form of thorough working of the soil after the crop and the adoption of a wide rotation. Seed crops liable to be attacked should be grown as far as possible from the site of a similar crop of the previous year.

THE SWEDE MIDGE (*Contarinia nasturii*, Kieff).

Examination of a field of swedes frequently reveals the presence of many plants which, instead of producing a normal neck and head, have a number of small lateral shoots, giving the plant a bushy appearance known as "cabbage top," a condition very prevalent in some seasons and on some soils. This trouble is usually brought about by damage to the terminal bud which results in the development of a number of lateral ones ; this damage may be caused by a number of factors, one of which is insect attack.

Of the insects causing cabbage-top probably the most common is the swede midge, *Contarinia nasturtii*, a small Cecidomyid fly the larvæ of which, when not actually destroying the terminal bud, may so injure the tissue that the leaves, instead of developing normally, assume a crumpled or savoyed appearance and the roots show a relative decrease in bulk.

Life History.—The swede midge (Fig. 14) is a small light yellowish brown fly with two delicate wings fringed with fine hairs and with slender yellowish legs also fringed. In the female the body is prolonged into an ovipositor by means of which the eggs are deposited about the plant. According to Taylor (30) "The eggs which individually are scarcely visible to the naked eye, are deposited in strings and clusters on the leaves, sometimes on the upper surface of the blade, but more frequently on the upper surface of the stalk, the younger leaves in the heart of the crown being selected for the purpose." After a few days small, whitish, legless maggots hatch from the eggs and feed on the succulent tissue, attacking only the surface layers. Taylor mentions that they do not blister or tunnel into the tissue, which form of attack is frequently seen in connexion with infestation by leaf miners, such as *Drosophila* and *Phytomyza* species.

The plant's reaction to the attacks of the midge larvæ is a swelling of the leaf bases and a clustering of the leaves across and about the terminal bud, the leaves assuming the savoying previously referred to. The attack, therefore, checks the development of the plant and delays maturity. When large numbers of eggs are laid about the terminal bud the larvæ may seriously injure it or kill it outright, the effect of which is the forcing of the lateral buds and the development of the many-necked condition.

The maggots mature in about three weeks: they are then about 2.5 mm. in length and pale yellow in colour. They leave the plants and enter the soil where they spin silken cocoons in which they pupate, emerging as perfect insects in about a fortnight to three weeks in the summer, but the autumn broods spending the winter in the soil and emerging the following spring. Prior to emergence they work their way out of the cocoons to the surface of the soil, projecting just out to the air, thus facilitating the escape of the insect.

The flies may be found from June to September and will infest turnips, rape, wild radish and cabbage, in the latter case causing a form of blindness. Weather conditions play an important part in governing the appearance of the pest and in favouring the development of seasonal attack.

Control.—Little can be done in the way of direct control measures as the maggots are usually beyond the reach of insecticidal applications, but cultural methods such as wide rotations and the employment of trap crops where serious infestations occur reduce the likelihood of attack. Regarding trap crops: since the midges lay their eggs on the first suitable plants it has been suggested (30) that a few rows of swedes be drilled round the headlands of fields known to be infested with the midge; when these are seen to be heavily attacked they should be carted off and destroyed. To obtain the maximum benefit from this measure it should be adopted as a routine practice by all the growers of the district.

LEATHER JACKETS, OR THE LARVÆ OF DADDY LONGLEGS (*Tipula* Species.)

When newly ploughed land is put down to market garden crops, these usually suffer very seriously from attack by leather jackets, since grassland is one of the favourite sites for oviposition by Crane flies or daddy long-legs; crops following temporary leys or "seeds" are liable to attack for the same reason. The insects usually breed freely in damp meadows, along dyke sides, and in similar situations where rank vegetation occurs: various species occur in slightly different conditions, but on the whole the group is highly adaptable and may be found on the lighter, drier uplands, in good, rich, deep, well-tilled garden soil and also in undrained marshes. The species most frequently recorded as being of special importance are:

Common Crane Fly, *Tipula oleracea* L.
Marsh Crane Fly, *T. paludosa*, Meig.
Spotted Crane fly, *T. maculosa*, Meig.

All are characterised by the possession of six long slender legs, two narrow, membraneous wings delicately veined, a stoutish, pointed body, a small head and short head feelers. The larvæ of the various *Tipula* have the same feeding habits: they attack the roots and stems of plants just below the soil level, frequently issuing from the soil at night and attacking vegetation above ground, when they cause serious losses by their depredations, especially if the attacked plants are young. This happens particularly where, for some reason, land generally under market garden crops becomes infested, for the leather jackets work great havoc amongst all kinds of vegetable crops and may extend their attacks to choice flowering plants, such as carnations and herbaceous plants.

Life History.—The adult flies may be found on the wing from May to September or October, hence oviposition takes place over a considerable period and leather jackets in all stages of development may be found throughout the season. The shining black eggs are laid either singly or in clusters of as many as six in one place. Discussing oviposition, Rennie (24) states, "The female stands in a vertical position with the ovipositor pushed well down and into the soil if she can reach it." The eggs hatch in about a fortnight and give rise to maggots which are blunt at the tail and pointed at the head. These maggots feed on a variety of vegetable substances and are most persistent in their attacks on growing crops, root crops frequently suffering to a considerable extent from their depredations. They feed below the surface during the daytime and at or above the surface at night, appearing above ground towards evening and often working their way into the hearts or crowns of plants where they cause much destruction.

The mature larvæ measure up to 1½ inches in the large species, *Pachyrrhina imperialis*, the Giant Crane Fly, but 1 inch is the usual length for the Common Crane Fly (Fig. 15); they are brownish, brownish grey or grey, usually harmonising well with the soil; the skin is tough and much wrinkled and the blunt tail end furnished with tubercles and breathing pores. When fully fed the leather jackets descend deeper into the soil and pupate; in length the pupa is similar to the larva, but is of a dull brownish colour and provided with spines by means of which it works its way to the surface just prior to the emergence of the fly; the pupæ may be found from June onwards throughout the summer.

Larvæ from the September flies feed throughout the winter, especially during mild spells, but in cold and frosty weather they work their way deeper into the soil. They pupate about March or April usually, and the earliest crane flies of the season originate from these pupæ. Almost immediately after emergence mating takes place and the females proceed to deposit their eggs at once, thus land once infested is likely to remain so for some time unless local conditions become unfavourable.

Control.—Though insect parasites do prey upon leather jackets their great enemies are the birds, and Theobald states (32), :— "Amongst the birds which are great 'leather-jacket' destroyers are the following: the rook, the starling, the peewit, various gulls, the pheasant, and, to a lesser extent, all the *Turdidæ*, or thrushes and blackbirds. Enormous numbers of these larvæ are devoured in autumn, winter and spring by the former birds, and the pheasant's crop may frequently be found full of them." Insectivorous birds, such as swallows and fly-catchers, prey on the adult flies, and moles are said to destroy many larvæ, especially on grassland.

Control of the leather-jacket pest may be obtained by cultural measures and the application of insecticides or deterrents. The first of these include keeping down rank vegetation, which might encourage the crane flies to oviposit, rolling in early morning when the leather-jackets are still at or near the surface in order to crush many, and stimulating the attacked crops with dressings of such fertilisers as nitrate of soda and sulphate of ammonia. In giving advice regarding leather-jacket attack on strawberries, Lees writes (15) . . . . . " Roll the soil as firmly as possible (in this case by means of cart wheels) and then . . . . secure a dust tilth of about two inches. This method has given excellent results in field practice." This might be worthy of trial in the case of either roots or young cabbage.

Various substances have been applied to the soil in the hope of destroying leather-jackets or preventing their further attacks. Certain coal tar products, such as naphthaline and creosote have been used in this connexion, but success has not been constant, and until a reliable soil-insecticide is available, thorough working of the surface soil in dry weather and good cultural methods will be likely to yield most satisfactory results.

THE CABBAGE ROOT FLY (*Chortophila brassicæ*, Bouché).

One of the most widespread insect pests of the *brassica* family is the cabbage root fly, a pest which, because it does not commit its depredations on the upper portion of the plant, frequently causes serious loss to growers before the trouble is diagnosed. The damage done by this fly causes cabbages, cauliflowers, etc., to " bolt," or, when the pest is very numerous, to wilt and die. Radishes and turnips are often attacked and the former are rendered unfit for table use.

Life History.—If the soil is scraped away lightly from the roots of brassicas which have been planted out a short time, close examination may reveal minute, white specks, five or six to a plant. These are the eggs (Fig. 16) of the cabbage root fly, which is one of the true flies or *Diptera.* The eggs, which are snowy white in colour, elliptical in shape, and about four times as long as they are broad, are laid in the soil just below the surface or at about half an inch below where the soil is loose in texture and in very close proximity to the young plants. If examined with a hand lens the eggs will be seen to have somewhat wavy furrows and ridges running lengthwise, and on one side a deep longitudinal groove along which the larva breaks the enclosing membrane on hatching.

The maggots are very small, white, and legless. They are roughly cylindrical in shape, but the segments forming the body taper off from the thick blunt tail to the more pointed head. These segments give the body a ringed appearance, very noticeable when the maggot is in motion. The larva has no distinct head but at the pointed end are two small black hooks, which correspond to jaws. These are used to rasp the plant tissue and the maggot feeds on the juices which the plant exudes from the wounds thus inflicted. The hooks can be drawn into the body or protruded as occasion requires. At the blunt end of the body are a number of tubercles.

When fully fed, the larva (Fig. 16) measuring about one third of an inch, contracts ; the outer skin gradually changes from white to a colour varying between a pale yellowish brown and a dark reddish brown, and hardens, forming a tough, protective covering for the chrysalis developing within. This stage is known as the *puparium* in contrast with the *pupa* of other insects, which is revealed when the outer skin is shed. The puparium of the cabbage root fly resembles a plump grain of wheat in size and general appearance other than colour. It is probable that the winter is passed in the puparial stage in the soil, although maggots may be found in November

The female cabbage root fly measures about a quarter of an inch in length, being rather smaller than the common house fly, and having a more slender, tapering body. The general colour is ashy grey or a pale greyish brown, occasionally with an olive tint. On the thorax is a longitudinal black line with fainter lines on either side. The wings, when at rest, are carried almost parallel with the body and overlap more than do those of the house fly. The eyes are dark reddish in colour and, unlike those of the male, are distinctly separate. On the head, thorax, adbomen and legs are bristles of varying lengths. The male is smaller and darker than the female fly, but resembles it in general appearance. The flies appear in spring during April, May and June, the time of maximum appearance depending directly on weather conditions.

Control Measures. Natural factors checking the Pest.—Cold, wet springs are particularly unsuitable for the emergence of the flies, and in such seasons many puparia and newly emerged adults perish. Hot weather at the period when the females are ovipositing is often responsible for the non-hatching of many eggs. Continued dry weather at the time when the flies are ready to escape from the puparia frequently prevents considerable numbers from emerging. In Canada, experiments carried out by Cæsar (7) at the Ontario Agricultural College, showed that about 89% of the eggs laid in a dry soil failed to hatch, as compared with about 27% on moist soil under the same conditions. Certain insects, such as ground beetles, destroy both the eggs and larvæ of the cabbage root fly and mites are often responsible for the destruction of the over-wintering puparia.

Cultural Treatment.--One of the most important factors in lessening the risk of an attack by the cabbage root fly is good cultivation. If the surface soil can be thoroughly but shallowly cultivated so as to secure a light dust tilth prior to the planting out of summer cabbage and cauliflower a large number of the eggs will fail to hatch, and this gain will be emphasised if the soil between the rows is kept cultivated until the plants get well established.

Stimulating the Crops.—Light dressings of nitrate of soda or Peruvian guano are often of considerable benefit as they stimulate growth, forcing the plants past the stage when attacks prove most injurious.

Preventive Treatments.-As a preventive Roebuck (26) states that the following treatment has often given satisfaction: dipping the plants in a thick emulsion of soot and lime prior to planting out.

During recent years corrosive sublimate has been largely used in America for controlling the cabbage root fly, and in Ontario alone it is estimated (11) that £10,000 worth of crops were saved by it in one year. The treatment consists of applying a solution of 1 oz. corrosive sublimate to 10 gallons water. The best method of preparing the solution is to dissolve the corrosive sublimate in a little hot water in a wooden tub and then make up to the full quantity with cold water. The solution can be easily applied by means of a small tin nailed to a stick eighteen inches to two feet long. About one-third of a tea-cupful is required for each plant; it is poured round the stem so as to saturate the soil immediately surrounding the roots. One gallon is sufficient for sixty plants, and one man can do about five hundred plants an hour. Every care must be exercised in handling the solution as it is very poisonous: all vessels must be thoroughly washed after use and the solution must never be allowed to stand in a metal receptacle.

For Small Gardens.—For small acreages a repellent dressing has been recommended by Smith (29). This consists of a mixture of creosote and chalk in the proportion of 1 oz. creosote to 3 lbs. of chalk. The powder should be dusted round the plants at the time of setting out, and two or three applications should be given at fortnightly intervals. Three pounds of the mixture is sufficient for 36 square yards.

LEAF MINERS (*Drosophila* Sp. *and Phytomyza* Sp.).

Occasionally leaves showing brownish or whitish blister-like areas may be seen among turnip or swede crops and on close examination whitish or greenish yellow, legless maggots may be found feeding on the leaf tissue within the damaged areas. These are the larvæ of certain leaf mining flies belonging to the order *Diptera.* Curtis (8) records the larvæ of *Drosophila flava,* Fln. and *Phytomyza nigricornis,* Macq., as attacking turnips and swedes, and states that while the former species feed beneath the upper cuticle of the leaves and cannot be seen from below, the larvæ of the latter feed on the undersurfaces, forming long, irregular galleries inside the lower cuticle. The larvæ were observed by Curtis to pupate in the leaves, and he gives the pupal stage as about twenty-one days.

The pest is very widely distributed, some plants being attacked in practically all crops of turnip and swede, but it is rarely recorded as causing serious loss ; and though the writer has observed swedes as commonly infested in Gloucestershire and Somerset no measureable depreciation in the crop was noticed.

THE CABBAGE APHIS (*Brevicoryne brassicæ,* L.).

Of the insect pests of cruciferous crops it is probable that there is none more persistent than the aphis or green fly. for scarcely a year passes but this insect is reported as damaging either cabbage, cauliflower, turnip or swedes. Thus, though in 1920 and early 1921 there were few outstanding cases of serious infestations, there was a widespread epidemic in the autumn of the latter year and large areas of cabbage, swedes and turnips were rendered unfit for use. During 1923 in East Anglia attacks were late in developing, but the pest caused considerable loss through the infestation of cauliflower and cabbage ; many plants were destroyed soon after setting out and many heads of cauliflower rendered unfit for market.

Life History.—The cabbage aphis (Fig. 17) may be found in May or early June on cultivated brassicas and cruciferous weeds. Towards the end of June and into July seedlings and young plants may be found with small colonies of the pest about the under-surfaces of the leaves causing irregularities on the upper surface ; these are dome-shaped and within the hollow depression below the dome small colonies of aphis are located. The small yellowish aphids are clustered together and covered with a kind of whitish powder. As they feed and increase in size and number the infested area of the leaf becomes yellowish and later quite white, giving the plant a variegated appearance. As the season advances the aphids increase in number and the plant becomes more and more unhealthy. The lower leaves droop until they nearly touch the ground and the inner leaves fall apart loosely and no heart is formed. Fig. 18 shows a plant in this condition with the aphis still swarming over it. In Fig. 19 the early stages of an attack are seen; colonies of aphis are shown developing on the backs of the lower leaves.

Among such colonies are produced winged broods which fly to other plants and there give rise to fresh broods by producing living young. As autumn approaches winged males are produced and after mating eggs are laid by the females. The eggs are yellowish green at first but later become black. Masses of aphids and eggs may be found in November on the undersides of old leaves; eggs may frequently be found located and near the bases of the leaves. Many eggs are laid on cruciferous weeds and these form a source for fresh infestation the following year. In mild winters occasional specimens of wingless aphids can be found throughout the winter in the hearts of plants where they are more or less protected from the inclemency of the weather.

Control Measures.—Among natural factors which tend to reduce or check this pest may be mentioned weather conditions and insect eenmies. Wet weather continuing for some time in midsummer, when the colonies are getting established, often tends to check the spread of the pest. Thus in 1917 (5) aphid attacks on brassicas were becoming serious, but the heavy rains at the beginning of August gave them a check. Cabbage aphids are particularly liable to the attacks of other insects and vast numbers are parasitised by small *Hymenoptera*, which deposit their eggs in the bodies of the aphids. The developing parasite kills the aphis, which, however, remains attached to its food plant; the body becomes somewhat distended and assumes a dry, bleached appearance and the outer skin forms a protective covering for the parasite until it is ready to emerge, a perfect insect; it emerges through a circular hole cut in the back of the aphis. The larvæ of the various species of Hover flies (*Syrphidæ*) feed on the aphids, sucking the juices and discarding the dead bodies; numbers of these larvæ may be found on infested plants. Ladybirds (*Coccinellidæ*) also do much to check this pest; their active larvæ have voracious appetites and feed ravenously in the aphid colonies.

Regarding preventive and remedial measures: if odd colonies are noticed in the seed beds of autumn cauliflower and summer cabbage, the plants should be dipped in a wash of soft soap and nicotine before being set out. When an attack develops in the field the crop may be sprayed with soft soap and nicotine; a satisfactory spray consisting of:—

Soft Water...	50 gallons.
Soft Soap	8lbs.
Nicotine, ...	4 fluid ozs.

This spray should be carefully applied, the nozzles being arranged to wet the under-surfaces of the leaves as well as the heart.

Many powder sprays are now on the market; they usually contain nicotine in some form or other, and might prove more convenient than a wet spray where large areas of cabbage are to be treated.

It is important to keep down cruciferous weeds which may harbour the pest and to clean up and burn all crop residues after the removal of the crops; this is an essential practice where large acreages of brassicas are grown for market garden purposes.

THE CABBAGE WHITE FLY (*Aleurodes brassicæ*, Walk.).

This small and fragile insect has been known as a cabbage pest for some years; it occasionally occurs in epidemic form when it attracts considerable attention for it is seen rising in clouds from allotments and gardens. In the year 1921 a widespread outbreak of the pest occurred over the southern half of England; this had gradually developed from the autumn of the preceding year and was coincident with a general infestation of cabbage aphis.

Life History.—The adult white flies are small, white moth-like insects having a wing expanse of about 3 mm. They have two pairs of wings, seven-jointed head-feelers and mouth parts drawn out to a beak like those of the aphis. The wings and body are covered with a kind of mealy wax which, according to Lefroy (16), " is formed of short, curled, waxy filaments secreted from unicellular glands and spread over the body, legs and wings, probably as a protection."

The insect (Fig. 20) usually lays its eggs on the undersurfaces of the leaves either singly or in clusters. Each egg has a peculiar anchor process, which is embedded in the cuticle of the leaf. The eggs give rise to small, active larvæ, which crawl over the leaves, and finally settle down and embed their mouth parts in the tissues. As the larvæ develop they gradually become covered by a waxy, scale-like covering. After some time pupæ are formed beneath the scales, and these give rise to the winged adult in from four to ten days. Among plants attacked may be mentioned cabbage, cauliflower, savoy, sprouts and kales.

Control.—Some natural factors apparently have considerable influence on the white fly, hence the occurrence of epidemics; thus in 1911 outbreaks were reported in the south-west of England and again in 1921; both these years were warmer and drier than usual, conditions which may be favourable for the rapid increase of the pest. Natural enemies of the white fly include insects like ladybirds, hover flies and lacewings.

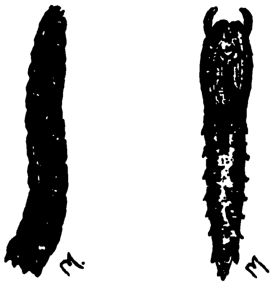

Fig. 15. "Leather Jacket" and Pupa of "Daddy Long Legs." (Slightly enlarged).

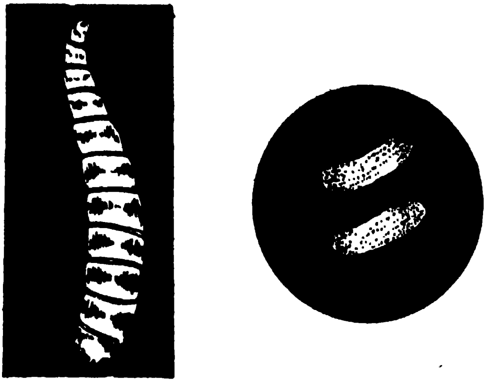

Fig. 16. Eggs of Cabbage Root Fly (much magnified). Cabbage Root Maggot (× 7).

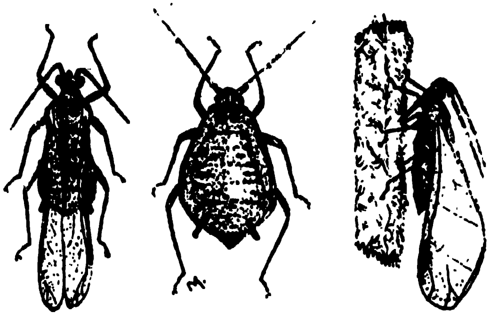

Fig. 17. Winged and Wingless Forms of Cabbage Aphis (magnified).

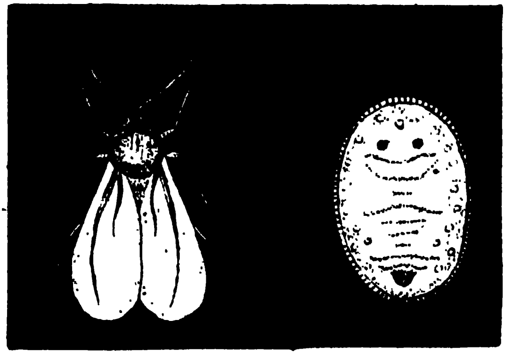

Fig. 20. Cabbage White Fly and Larva (much enlarged).

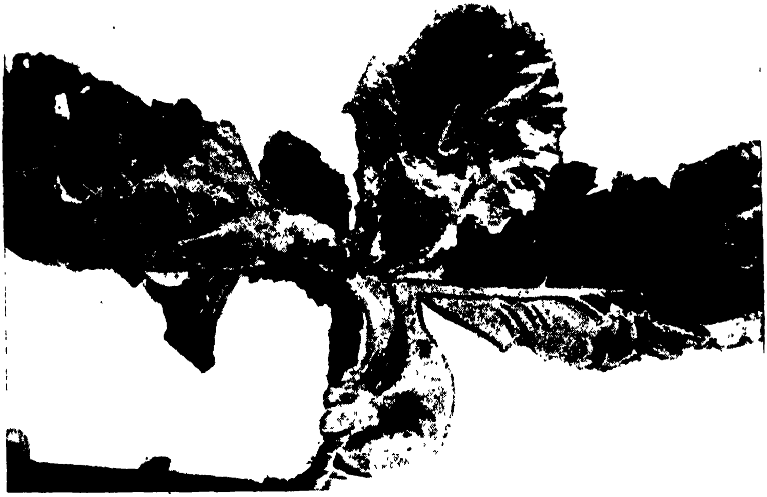

FIG. 18. HALF GROWN AUTUMN CABBAGE INFESTED WITH APHIS (*Brevicoryne Brassicæ*. (*Photo. H.W.M.*).

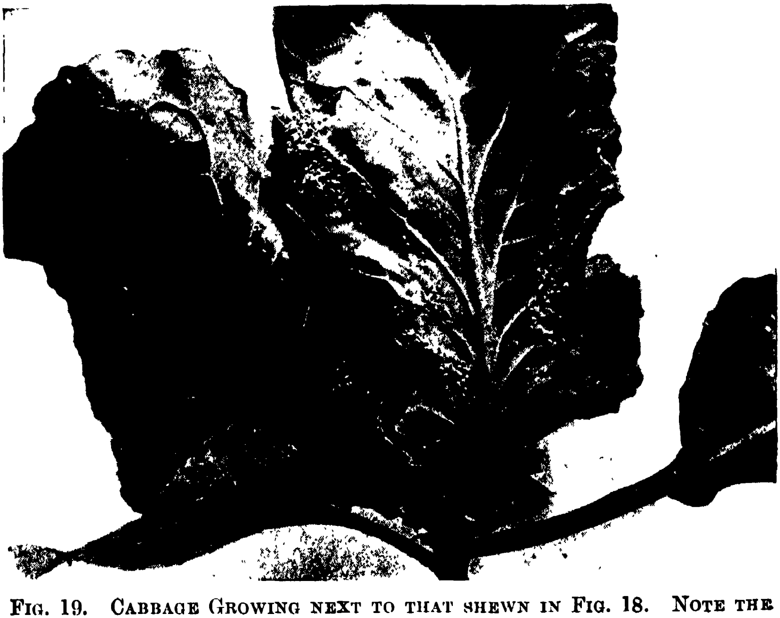

FIG. 19. CABBAGE GROWING NEXT TO THAT SHEWN IN FIG. 18. NOTE THE COLONIES OF APHIS BECOMING ESTABLISHED. (*Photo. H.W.M.*).

As regards treatment for the pest, in 1921 (22) spraying the crop three times with soap and water appeared to prevent a further increase of the pest both in Kent and Hertfordshire. In small enclosures it is advantageous as a general cultural method if all yellow drooping leaves can be picked off and burned, since many of the insects find shelter beneath them.

* * * * * *

From the foregoing survey of the pests of cruciferous crops it will be gathered that there are certain factors which favour the attacks of insects ; these include the presence of abundant and easily accessible food material, suitable climatic conditions, and an unusual scarcity of natural enemies. For the control of these pests certain general measures are applicable in the majority of cases : these are keeping down weeds, suitable crop rotation, thorough preparation of soil, good interculture, correct manuring, and the choice of varieties which suit local conditions and possess specially resistent characters : attacks occur frequently through lack of attention to these details, the importance of which cannot be too greatly emphasised.

Epidemic attacks are the result of especially favourable circumstances which cannot usually be foretold. These are generally dealt with by employing such means as spraying, and it must be remembered that the correct spray to use is based on some characteristic of the particular pest in question, consequently one spray is not universally applicable. Under normal conditions, however, the liability to insect attack is more or less directly proportionate to the standard of farming maintained in any area, and it will be found that the best means of controlling insect outbreaks is by judiciously following the various principles constituting clean husbandry.

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IV.—SOME EXPERIENCES IN AGRICULTURAL EDUCATION.

By Professor Douglas A. Gilchrist.

Some experiences of teaching, experimental and advisory work in Agriculture since 1889, when the writer was appointed as Lecturer in Agriculture in the University College of North Wales, Bangor, will be dealt with in this paper. Older members of this Society will remember the trying time for agriculture which culminated in 1894. In that year the average price of British wheat was only 22s. 10d. per quarter, the lowest recorded since before 1771. The total acreage of wheat grown in England in 1875 was about 3⅓ million acres. By 1894 this had been reduced to 1,827,000 acres, and in 1895 to about 1,340,000 acres, or nearly half a million acres less in 1895 than in 1894. The corn-growing counties suffered especially, farm after farm in the counties round London becoming derelict. Older methods of intensive corn growing became obsolete and much land "tumbled down" to grass under the very worst conditions. The disastrous reduction in corn growing, especially in wheat, culminating in 1895, should have its lesson in the present crisis in Agriculture.

The Board of Agriculture in September, 1889, was entrusted with the duty of awarding grants for Agricultural Instruction, among the first to receive such grants being the University College of North

Wales, Bangor, for general instruction in agriculture, and the Bath and West Society for dairy schools and experiments. An article by the writer in this Journal in 1894 on " The Development of Collegiate Centres for Agricultural Instruction " deals with this work in these earlier years. At that time it was not recognised that in countries like the United States and Canada agricultural education and research were making great progress and doing much to develop every branch of agriculture, whereas such means were being very much neglected in this country.

It is impossible in a short paper to deal with the development of this agricultural education movement in England, and the writer will confine himself to comments on how the education of the young agriculturist and the research worker has been developed, and how also field and other experiments have been conducted with the object of helping the farmer in the conduct of his farm.

In the first place it should be recognised that there are no better farmers anywhere than in Britain. The young British agriculturist has made a success in all new countries and is recognised as a most valuable immigrant to such countries. It is held by some that agricultural education should be purely scientific, and there can be no doubt of the value of a sound scientific training, but the agricultural student in any branch of agriculture or agricultural science is far from being fully equipped unless he is thoroughly conversant with the practical conditions underlying his work. It must be recognised that in the past our best farmers have had little or no scientific knowledge and have been successful because of their high abilities as managers of labour and of live stock, an because they knew how to cultivate the soil under the best conditions and what crops would grow successfully on their land. They were also good business men, knowing all about how to market their produce in the best manner and the kind of produce they should aim at to suit the local market, soil and climatic conditions. Those in charge of agricultural education and of advising students what courses they should take should be as conversant as possible with the various openings and possible developments in different branches of agriculture, and courses of instruction should be so organised that they are best suited for the purposes desired by each kind of student. Students who intend to farm or to manage mixed husbandry farms should have the fullest possible all-round course that their circumstances and time will allow. Those desiring to specialise in dairy work, in poultry keeping, etc., should be specially provided for. Those desiring to be fully equipped in the sciences relating to agriculture should have the fullest possible training in such sciences, but should also be as fully conversant with how to apply their special knowledge to the practice of any branch of agriculture. Much misunderstanding about agricultural education would be cleared up if these conditions were recognized.

From experiences at the University College of North Wales, Bangor, from 1889 till 1894: at Reading College, now University College, Reading, from 1894 till 1902; and at Armstrong College, Newcastle-upon-Tyne (University of Durham), from 1902 till now, the writer has found that many of the intelligent farmers have been most anxious that their sons should obtain the best course of instruction possible. The interest of these farmers has been greatly enhanced because their sons when taking courses of training have talked over with them the various farm problems dealt with in the courses of instruction and in this way the farmers have been brought closely into touch with the collegiate centres. The result has been a development of the value of the teaching because the teachers have in this way become more conversant with agricultural problems in connection with their subjects. The student, the teacher and the farmer have thus been mutually most helpful to each other and done much to promote the value of the teaching, making it still more scientific and at the same time more useful to the agriculture of the district. An enormous impetus was given to this tendency when the Ministry of Agriculture decided to attach Advisers in such subjects as Agricultural Chemistry, Agricultural Zoology and Agricultural Botany to the Colleges, who would be free to study the problems with which farmers have to grapple. Already our scientific knowledge of soils, manures, insect pests and plant diseases has been greatly increased, and farmers, by following the advice of such Advisers, have been enabled to cope much more successfully with their difficulties.

Courses of instruction in the various subjects have also become more useful because the teachers have more of the right knowledge available, and can give such instruction that the student is more fully equipped for dealing with the problems of the farm.

The teaching of Agricultural Economics must receive considerably more attention than in the past and this should be done to a large extent in the classes in agriculture, whether dealt with otherwise in a special class or not.

As an example, Mr. W. F. Massey, Prime Minister of New Zealand, has stated recently that that country is rapidly becoming the dairy farm of the Empire, and that last year New Zealand exported nearly £17,000,000 worth of dairy produce, mainly butter and cheese. He believed that no other country in the world exported so much, and that certainly no other country exported so much to Britain. He also stated that New Zealand sends more lamb and mutton into Britain than all the other countries put together. Before the war Siberia was a very large importer of butter to Britain, and it may be only a question of a few years till this takes place again. The teacher of Agricultural Economics should make a close study of the possibility of the development of agricultural imports to this country, especially from the British Empire, so that he may be in a position to forecast as far as possible in what directions agriculture can best hold its own at home and to advise his students accordingly. A writer in " The Times," in dealing recently with this problem, urges that drastic changes should be guarded against, and discussed the views of a keen American who has just made a special study of agricultural conditions in this country and in Germany and Denmark. He finds that in England mechanical appliances were applied for the bulk of the work, in contrast to manual labour being so employed on the continent, but that in England just enough manual labour was used to improve on American mechanical systems. He also urges that the distribution of land and the systems of husbandry adopted in this country should not be overlooked, as they have grown out of the teaching of experience under our peculiar physical and climatic, and it also may be said, our market conditions.

Much misunderstanding has arisen as to the value of short courses in agricultural subjects. If in such courses an attempt is made to give a complete course in a short time it is certain to be a failure. Such courses should be suggestive and should indicate sources of information. The teachers should do their best to get those taking such courses to keep in touch with their collegiate centres and farm school afterwards. Most of the young farmers who have taken such courses continue to look to these institutions for further information and advice and in this way receive invaluable help in the conduct of their farms. This is an important reason why young farmers who have taken short courses of instruction, extending from six weeks to a winter, have got great help from them.

The Ministry of Agriculture has prepared an epitome on " Agricultural Research and the Farmer," which can be obtained from H.M. Stationery Office for 2s. 6d. This is an excellent resume of such work in this country. Plant nutrition and soil problems are dealt with at Rothamsted, Harpenden, Herts, by Sir John Russell and his Staff. Professor Biffen is head of the Plant Breeding Research Institute, University of Cambridge, and Professor Wood is in charge of the Animal Nutrition Research Institute at the same centre. Dr. Stenhouse Williams deals with Dairying at the National Institute for Research in Dairying, Reading. Mr. Orwin is head of the Institute for Research in Economics in the University of Oxford. Professor Stapledon deals with Plant Breeding at the University College of Wales, Aberystwyth.

Sir Stewart Stockman deals with Diseases of Animals at the Veterinary Research Laboratory, Weybridge, Surrey. Here diseases of poultry are now included and poultry keepers having trouble should write to the Director.

The special investigations now being made at all these centres are already of great value to the farmer and those having problems to deal with under any of these heads should communicate with the Directors of the respective stations. As an illustration of the effective manner in which such work is being carried out it may be stated that the laboratory at Weybridge prepares about 30,000 doses of vaccine annually to meet the demands of stock owners who have contagious abortion in cows. Full information as to all this work can be obtained from the booklet just mentioned.

The local experimental and advisory work carried out by the collegiate centres at the various Universities and University Colleges of England and at the Farm Institutes, with which so many of the counties are now provided, is proving of great value to practical agriculturists. The Head of the Farm Institute deals with County problems and keeps in touch with his collegiate centre, so that he can give the best advice possible when visiting farmers in his county.

There are now Agricultural Organisers in most counties in connection with the educational scheme of the Ministry of Agriculture those in the south-western counties being :—

CORNWALL—Mr. W. Borlase, Glynford, The Crescent, Truro.
DEVON—Mr. D. B. Johnstone-Wallace, 1, Richmond road, Exeter.
DORSET—Mr. T. R. Ferris, County Offices, Dorchester.
GLOUCESTERSHIRE—Mr. G. H. Hollingworth, Shire Hall, Gloucester.
SOMERSET—Mr. James Mackie, Cannington Court.
WILTSHIRE—Mr. R. Boutflour, Polebarn House, Trowbridge.

These organisers are giving most efficient assistance with agricultural problems and agriculturists should avail themselves as fully as possible of these services.

An experiment carried out by the Agricultural Education Department of the Devon County Council (Mr. Johnstone-Wallace, Agricultural Organiser) will serve as an example of how farmers can be assisted by such work. Trials of winter and spring oats were made during the season of 1922. "Great Mogul," a black oat sown on October 28th, gave 76⅓ bushels per acre, but only 35 bushels when sown on April 9th. Similarly "Bountiful" oat gave 71 bushels and 33 bushels. These are both spring varieties of oats. A white winter oat, "Marvellous," gave 79⅔ bushels when sown in October, and "Winter Grey" oat 66⅓ bushels when sown at the same time. The winter oats were probably favoured by the mild winter, and the dry summer also was against the spring oats, but these results are of the greatest value to farmers, especially as they are borne out by similar results in other parts of the country. These and other trials show that apparently the great damage now being caused throughout the country by frit fly can be checked effectively by the growing of winter oats, or, to a certain extent, by early sowing in spring.

Nearly 300 lectures were delivered in Devon last winter, with an average attendance of 35. Agricultural Discussion Societies are also being formed, which promise most valuable results.

Some personal experiences of experimental work in connection with collegiate centres in agriculture will serve to illustrate the nature of such work conducted from these centres.

Dairy investigations were conducted at Offerton Hall Farm for the Durham County Council from 1903 till 1914. It was shown that the milk of cows under good supervision and when well fed was very liable to be under the presumptive standard of 3% fat. The mixed milk of five cows was tested on 2,716 days and on 783 of these days the morning milk contained less than 3% of fat. The cows were milked three times a day. On 252 days the mixed milk of five cows was deficient in fat, twenty times in the morning and nine times in the evening when the cows were milked twice a day, the times of milking usually being 6 a.m. and 5–5.30 p.m. This brought out the liability of milk to be under the presumptive standard of fat, even under the best conditions.

Tests were made of the results of feeding cake and meal to milch cows on pasture in summer. When 8lbs. concentrated food (4lbs. Egyptian cotton cake and 4lbs. maize meal) were so fed to each of five cows and compared with half these quantities it was found that the latter gave milk of equal quantity and quality and the cows themselves did not suffer thereby. Further trials were made when one lot of cows each received 4lbs. concentrated food daily and the other lot no concentrated food. Again the milks of the two lots of cows were practically equal in quantity and quality. The results showed that cows in milk, grazing on fair pastures, gave no return for cake and meal fed in addition. It must, however, be noted that towards the end of the grazing season, when pasture is scanty and poorer in quality, additional food is necessary.

It was also shown in connection with the winter feeding of milch cows, that when normal feeding rations are fed the quantity and quality of the milk produced will be quite as satisfactory as when heavy rations are given to the cows. In this connection it must not be forgotten that a cow, naturally a heavy milker, requires additional food corresponding to her milk yield so far as it is safe to feed up to this extent. The better milkers should receive the heavier rations, especially of the concentrated foods.

A further most important experiment has been conducted since 1903 at Cockle Park, the Northumberland County Agricultural Experiment Station, on the possible improvement of poor pasture by feeding cake to the grazing stock, the result being very different from what was expected. On a 10 acre field Bombay cotton cake has been fed to the grazing stock of cattle and sheep at the rate of 3 cwt. an acre every year since 1903. On an adjoining field 10 cwt. an acre of high grade basic slag was applied for 1903, with 5 cwt. of the same for 1906 and every third year thereafter. The cattle and sheep have been weighed regularly and the result is that there has been an annual loss of 2s. 5d. an acre where cake has been fed, but a gain of 49s. an acre where slag alone has been used. Cake feeding has resulted in a pasture of a poor and benty character, whereas slag has given an excellent pasture with much clover herbage. When the trials were commenced it was expected that the cake feeding would have a considerable influence in improving the pasture, but the result is of an entirely negative character. Evidently the nitrogen of the cake, passing through the animal to the soil, has increased benty grass herbage but has prevented clover development. These cake feeding results have proved of great value to farmers as they have shown two definite conditions under which cake feeding may result in considerable loss. There are, of course, well-known conditions under which cake feeding is invaluable to the farmer.

In the writer's experimental work in connection with the improvement of pasture land, observations have shown that rain may penetrate quickly into the soil of an improved pasture, but very slowly when improvement is not progressing satisfactorily. At Cockle Park, in the cake feeding experiment on the poor pasture just referred to the soil was perfectly dry underneath the benty turf, whereas rain has penetrated deeply into the soil where phosphatic manures alone were applied and clovers and better grasses are developed. This is apparently due to the less amount of benty herbage and dead turf on the surface in the latter case, but may be also largely due to the better root growth, especially of the clover herbage, enabling the rain water to enter the soil freely. Owing to the slagged pasture being much more closely eaten the soil is near the surface so that the rain water enters it easily and manures become effective very quickly. There was little rainfall last summer at Cockle Park till near the end of July, but a very heavy rainfall in August. At the end of that month the soil was still quite dry underneath the turf on which cake had been fed, but had passed deeply into the soil of the slag pasture. Rushes are still growing in the furrows between the ridges of the cake plot, whereas they have nearly disappeared where slag has been applied. Apparently the rain water practically all runs from the higher part of the ridges to the furrows on the cake plot, whereas it passes evenly into the soil all over the ridges on the slag plot.

Recent experimental work with phosphatic manures has an important economic aspect. The good effects of basic slag for improving pasture are well known. The present cost per unit of phosphate of lime in basic slag, delivered to the farmer's nearest stations, varies from about 1s. 7d. to 2s. 3d. per unit of phosphate of lime. North African phosphates, ground so fine that 80% will pass through a No. 120 sieve, can now be obtained at farmers' stations in the north of England for about 1s. 2d. a unit.

On a poor pasture at Cockle Park the following manures were applied per acre in February, 1922. Each dressing contained 200lbs. phosphoric acid :—

(1) High grade basic slag, 42% phosphates and 80% through a 100 sieve ; 9 cwt. per acre cost 42s. 6d. = 2s. 3d. a unit.

(2) Finely ground North African phosphate, 63% phosphates, 80% through a No. 120 sieve ; 6 cwt. per acre cost 22s. = 1s. 2d. a unit.

In both cases the pasture improvement is marked and clovers have been well developed. It is difficult to say which of these dressings are most effective. Both of them show better results than other dressings of phosphatic manures applied alongside of them. An article by the writer on "Ground Mineral Phosphates as Manures" appeared in the "Journal of the Ministry of Agriculture," November, 1922, which deals with this question.

The leaflets issued by the Ministry of Agriculture on such subjects as Farm Live Stock and Feeding Stuffs, Dairying, Manures, and the various Farm Crops, Diseases and Insect Pests, contain most valuable information, as they are all prepared by experts.

Agriculturists can obtain single copies of these, free of charge, by writing to the Ministry of Agriculture, 10, Whitehall Place, London, S.W.1., and copies for distribution can be obtained at a small charge from the same address. Bulletins are also issued from the various collegiate centres and research stations. During the year 1922–23 leaflets on the following subjects, amongst others, were issued from Armstrong College for the use of agriculturists in the four northern counties: "Comparative Values of Farm Foods"; "Ground Mineral Phosphates as Manures"; "Improvement of Moorland Grazing"; "Seed Barley and Oats"; "Manuring of Potatoes"; "Lime and Its Uses in Agriculture"; "Production of Sugars and Albuminoids in Straws"; and "Frit Fly on Oats." Many applications are received for the guide to Cockle Park, the Northumberland Agricultural Experiment Station, issued by the authorities of that county and prepared by Armstrong College. The Agricultural Staff of this college dealt with over 700 written enquiries in that year as well as many verbal enquiries, and made about 250 visits to farms. This may be taken as representative of similar work from other collegiate centres.

The clean milk campaign, largely resulting from the work of Dr. Stenhouse Williams at the National Dairy Research Station, Reading, is now being fostered by the Ministry of Agriculture, and many of the centres for agricultural instruction throughout the country. A report on a Farmers' Clean Milk Competition in the County of Kent can now be obtained from Mr. G. H. Garrad, Agricultural Organiser, Kent Agricultural Education Committee, Sessions House, Maidstone, which contains much valuable information.

There is no doubt that the consumption of new milk can be greatly increased in this country, especially if the public can be assured that a large supply of milk is available, produced under the best conditions. The Live Stock Branch of the Ministry of Agriculture are doing much to improve the breeds of live stock, especially on the smaller farms. Experiments by Dr. Voelcker at Woburn, and by others, have shown that calves can be reared practically as efficiently and much more economically, by substituting other foods for milk after the calf is a few weeks' old. The sheep population of England was reduced by about 33% between 1911 and 1921, but the number of sheep in Northumberland has been practically maintained during that period. A study of the methods of sheep management on north country farms, and how far such methods could be adopted in the south, might be productive of good results. On the other hand, the pig does not take the important position in the north of England that it does on southern farms, but south country methods, especially as to open air treatment, are now being adopted in the north with considerable success. The feeding of farm live stock, whether indoors or on pasture, can be practised with much more efficiency and economy if suitable and well-balanced rations are adopted to the fullest extent, and if pastures and hay crops are so improved that a larger amount of herbage will be produced and that of much better quality. The latest results from the right use of phosphatic manures, combined with other manures when necessary, indicate that very much can be done in this direction.

The importance of the development of visits to experimental stations and farms by agriculturists cannot be over estimated. During the past summer many parties of farmers have been taken over Cockle Park, the number of visitors aggregating over 700. The opportunities given at such visits for the observation and discussion of the results have brought home to farmers the lessons of these results in a way that cannot be done simply by the perusal of reports from the Station.

The practical training of the farmer cannot be accomplished at agricultural colleges or on College farms. This can be done efficiently only on good farms where the student takes part in all farm operations and has full opportunities of becoming conversant with farm management and how to purchase and market live stock, manures, seeds and agricultural produce generally. As already indicated this business side of the training is by far the most important part of the equipment of the young farmer. The scientific and business training at the educational centres can be rendered fully efficient only when it is accompanied by this thorough, practical training. A farmer's son has, as a rule, obtained a very thorough practical training at home. A well-known Northumberland farmer, who has had marked success in the training of pupils, stated recently :—"Above all, early hours must be enforced. The pupil who works as a labourer has the best opportunity of obtaining a good training. The farmer gains by having hard-working pupils on his farm, not only by their manual work but also by their education and college training. Youths should try to get on a farm where they have some responsibility at first, however small, and should do their best to find out the wishes of their employer and qualify for more responsible work. In this way their work becomes a labour of love and a more direct practical interest is developed in all the farm operations."

V.—ANIMAL PARASITES IN RELATION TO DISEASES OF FARM STOCK.

By Prof. J. Penberthy, F.R.C.V.S.

The above has been suggested as an appropriate title for an article in the current number of this Jour. al. While fully realising that few subjects bearing on the health of farm stock have claim to more serious consideration from stockowner and student, recognition of the magnitude of matters properly falling under this heading precludes any well-founded idea that the limits of this publication permit of its exhaustive treatment. The literature devoted to parasitology is already very extensive and a bibliography of contributions to the subject, compiled by the U.S.A. Bureau of Animal Industry includes many thousand references. A general dissertation indicating the importance of the study of parasites, their life histories, and their effect on health is the most that can be attempted here.

The losses attributable to parasites cannot be even approximately estimated, as there are no statistics relating to such. Commonly unrecognised and often unsuspected, parasites are always harboured by our stock and are responsible for a steady drain on our resources. A few animals may be noticed to lose condition, become more seriously ill and die, the real cause remaining undiscovered. When conditions favourable to development of the parasite obtain their destructive effects may be alarming, large numbers of animals becoming mortally affected ; attention of owners is aroused and investigation leads to discovery of the cause. These disastrous occurrences are usually seasonal and widespread, and on some occasions the losses to individual stockowners are ruinous.

Among the varied conditions under which the existence of living organisms is maintained, is that of dwelling together, technically known as *Symbiosis*, a union which may be permanent or temporary, but is essential to the well-being of, at least, one of the partners. In some cases this partnership appears to be advantageous to both —the state of "*Mutualism.*" In another form of symbiosis the union is advantageous to one of the parties and not detrimental to the other—"*Commensalism.*" In the other case one of the parties stands to gain all the benefit of the association to the detriment of the other. This is termed "*Parasitism,*" the unwelcome guest, the *parasite*, living at the expense of its fellow, known as the *host.*

Included in the last category are bacteria and other minute organisms which produce the so-called specific diseases. Except that many are of vegetable nature between these and the parasites, to which it is proposed to refer, there may possibly be no unassailable line of demarkation, but generally speaking, the former go through the whole cycle of life within their hosts, while the latter at some stage in their development, leave their hosts for the outer world, as an essential to arrival at the condition of maturity.

Ancient writings indicate that parasites were recognised as such long before the commencement of the Christian era. It would appear that 400 years before this it was assumed, if not proven, that certain small bladders found in pork after being eaten by the human subject developed into tapeworms in his intestines, an assumption, which in more recent times, scientific observation has proved correct.

Probably up to the close of the 17th Century only two or three parasitic worms, and those of large size, were known to exist. About this time methods of observation became more definite, and some little advance was made, but until the microscope became adopted in biological research and in the discriminations of the causes of disease, little progress was made in parasitology. Up to a comparatively recent period it had been conceived and taken for granted that parasites, whether worms or mites, came into existence by spontaneous generation, arose from dirt and disease, indeed, were the products of disease rather than its cause. It is, of course, quite unnecessary in these illuminated days to insist on acceptance of the fact that parasites of every species are invariably derived from pre-existing parasites of the same species. Many are very highly organised, having the most complex and perfect anatomical arrangements for carrying on their paratisic activities. Parasites of every species have a definite life cycle; the details, or stages in the life history of many have been revealed, while in some cases certain phases of development remain obscure, awaiting elucidation.

Scientific research has during the past 70 years provided a vast amount of new information of great interest and practical value, which has invested its study with additional importance in relation to health and disease of man and domesticated *animals. It is, perhaps,* to work *of the biologist pure and simple, rather than to* specially directed medical research that we are indebted for much of the fundamental knowledge, which forms the basis of measures devised to avert the damage and loss due to parasites. The study of the life history of living organisms has already yielded a rich harvest of facts capable of practical application in dealing with parasitic infestation. Though not long since everything connected with parasites was regarded with disgust, parasitology to-day must be accepted as a very fascinating study, offering a wide field for investigation. As is the case with animals and plants which do not live a parasitic existence, the birth, life, activities and death of parasites are governed by natural laws applicable to the species to which they belong. Generally speaking their habits are definite and fixed : many reside permanently or temporarily in or on animals of one species only, while some find congenial conditions in animals of more than one species. Thus situations contaminated with worms special to the horse and on which it would be dangerous to graze equines, may be perfectly safe for sheep or cattle. Advantage may be taken of such knowledge, by substituting sheep and cattle in place of equines, to avoid infestation and ultimately purify the pasture by removing the host which is essential to the development of eggs or embryos.

Having gained access to the animal, which naturally harbours it, the embryo of the internal parasite travels or is borne to the situation in the host in which it is to take up its residence, the so-called " predilection seat," which may be in any part of the animal's body. Each species of parasite has its own predilection seat and is rarely found elsewhere. These situations may be reached by various means, by the immature worm boring through the animal's tissues, for which purpose many embryos are provided with special apparatus, by the blood stream, or, as is the case with worms which infest the alimentary canal, by being carried there with food or drink. Parasites of the skin may pierce the integument, enter the tissues of their hosts, wander through them and finally reach their predilection seat in the skin at a part far distant from the spot at which they first entered.

The injurious effects of parasites may be due to irritation set up by the boring of embryos, by damaging protective structures and allowing of the entrance of bacteria or other disease-producing germs into the deeper tissues and blood stream, by interfering with digestion and nutrition, by blocking the intestinal tube or blood vessels, and by being the actual carriers of specific disease germs to healthy animals, etc. Unlike the bacterial virus of contagious diseases, the parasites to which we refer—the worms and mites—except in the case of a few, perhaps, do not poison their hosts with toxins.

Internal parasites rarely enter their definite hosts in the adult, sexually mature state, but as eggs or embryos, which reach that stage within the animal, where eggs and embryos are formed, which pass thence to the outer world, where, if conditions are favourable they attain the condition in which they are prepared to infect other hosts. During their stay in the outer world the embryos or larvæ of many species of parasite do not develop to that stage at which they can become parasitic to the definite host until after they have entered and spent a period of residence in another animal—an intermediary host—which is absolutely essential to completion of their life cycles. If the embryo does not meet its intermediate host it must perish after a longer or shorter time.

1.

The life cycle of some parasites is completed by what is known as "alternate generation." Such organisms may be parasitic to animals of one species in the immature form and to animals of a different species in their mature or final form. A familiar example is afforded by the parasite which causes the condition known as Gid, Sturdy, Vertigo, Goggles, etc. In its final state it appears as a tapeworm, the *tœnia cœnurus*, in the intestine of the dog, where immense numbers of eggs are produced and deposited on the pastures with the animal's fœces. If swallowed by a suitable animal the egg passes to its stomach where the shell is dissolved by the gastric juice and an embryo, possessed of six hooks, emerges. This embryo is believed to bore its way through the walls of the stomach or intestines and by wandering through the tissues or by being borne by the blood stream to reach the nervous system, *i.e.*, the brain or spinal cord, more commonly the former, and if arrested at any other part it rarely develops there. In the brain the embryo forms a cyst or bladder, which may reach the size of a hen's egg. It contains a watery fluid and numerous *scolices*, or heads of future tapeworms. These heads are usually numerous, one bladder may contain 300 or 400. Each head, under favourable conditions, may become a tapeworm, and the fluid tends to increase in amount and the bladder to increase in size, thus exercising that pressure on the brain substance, which is largely responsible for the symptoms of "Gid" and for the softening and bulging of the bones of the forehead. The symptoms will, of course, depend on the situation of the bladder and the parts subjected to the pressure, but most commonly the striking features are abnormal movements and loss of power, walking in circles, high stepping, blindness, etc. This bladder worm though occasionally met with in the horse and man, more frequently affects ruminants and particularly young sheep.

The distribution of the parasite is wide, and usually the losses in a flock under ordinary circumstances are not heavy, though in the aggregate "Gid" must be responsible for large sums. However, when pastures are heavily infested with the eggs of this tapeworm and grazed by lambs the damage may be very serious. It has come within our experience to meet with "outbreaks" in which as many as 300 lambs in one flock have succumbed to gid in a season.

Though it is within the bounds of possibility that an operation for the removal of the bladder by cutting through the bones of the cranium may improve matters, at least, temporarily, it is only after the bone over the bladder has become soft that the ordinary individual is able to determine its situation, and when the disease has reached this stage the value of ordinary sheep will scarcely warrant the expense. In case of very valuable animals it may be advisable for an expert to perform the operation of trephining and removal of the cyst, but generally it will prove economical to sell to the butcher at the earliest manifestation of Gid.

While the cure of this parasitic affection cannot be regarded as hopeful preventive measures, based on facts connected with the life history of the tapeworm, as revealed by scientific research, are far more promising. As there can be no bladder (*Cœnurus cerebralis*) in the brain which has not developed from the eggs of the particular tapeworm (*tænia Cœnurus*) of the dog, our aim must be to destroy the eggs before they are deposited on pastures or other situations to which sheep and cattle have access. To accomplish this, all dogs likely to contaminate pastures, etc., should be kept in some enclosed space and receive at intervals of three or four days doses of appropriate worm medicine. The excreta should be collected and burnt. As the tapeworm would not exist unless dogs ingested the bladder or heads of affected animals, the heads of affected sheep should be burnt, boiled, or disposed of in such manner as to prevent dogs from consuming them. The eggs of this tapeworm may retain their vitality for months in damp situations, but soon die if exposed to sun on high, dry ground on which it is advisable to place sheep under circumstances indicating that the sheep dogs and others harbour the particular tapeworm.

II.

Some parasitic worms must necessarily pass a portion of their existence in another vertebrate or invertebrate animal, called the intermediary host, before they can become parasitic to the animal in which they are recognised as causes of disease, spoken of as the "definite" or "ultimate" host. A knowledge of the conditions of life of the intermediary host is highly important, as in case of some of the destructive parasites the most practicable and effective means for preventing infestation of farm stock may be found in rendering conditions unfavourable to the existence of this element, without which the embryos cannot further develop.

Among the most striking examples of the value of research in economic biology is to be found in the natural history of the *Liver Fluke*, or *Distoma Hepaticum*, a flat worm, harboured by animals of several species, including sheep, cattle, horses, pigs, and the human subject, and more particularly harmful as a parasite of sheep, in which its effects are sometimes disastrous. The distribution of the Liver Fluke is almost universal, and its parasitic existence in the liver has been recognised for several centuries. Board of Trade returns report that from 1879 to 1881 there was a diminution of 3,500,000 sheep in Great Britain, attributed mainly to flukes in the liver. Though within recent years these worms have been commonly found in the livers of sheep and cattle in small numbers, we have not since experienced such disastrous, widespread outbreaks of *Liver-Rot.* On a few occasions some flocks, within restricted areas, have suffered severely, and sporadic occurrences in which small numbers have become seriously affected are not uncommon. As the fluke provides in its ova the seeds of this disease the occurrence of which is so affected by moisture or drought, one of the essentials is usually present should circumstances particularly favourable to depelopment arise.

The adult fluke is hæmaphrodite, *i.e.*, both sexes are included in the one individual. Though "stray" flukes may occasionally be found in other parts of the body of the host, the bile ducts of the liver are its predilection seats or habitat. Here the fluke deposits its ova, which pass to the intestines with the bile and are discharged into the outer world with the intestinal excrement; sometimes the egg bearing parasite is expelled bodily through the same channel. The number of eggs produced is prodigious, it being estimated that in course of its comparatively short life a single fluke may discharge about 40,000.

In the outer world, if conditions are favourable, *i.e.*, water available, and a fairly high temperature (from 70°F. to 97°) obtains, the embryo develops within the shell, and in course of three to six weeks emerges through an opening made by the lifting of a lid at one end of the egg. The embryo is now provided with hair-like processes (cilia) and swims about freely in standing water on pastures, etc. The normal span of the existence of the fluke embryo in this stage is usually from a few hours to a day. In the free swimming stage, if a certain snail is at hand, the embryo bores into the tissues of the mollusc and there undergoes certain changes, and numerous small bodies (cercaria) are formed, which work their way out of the snail, get into water, swim about and fix themselves to wet herbage, where they become encased. On blades of grass, etc., they are small specs, just visible to the naked eye. In this form they are taken into the animal with its food. In the body of the snail as many as 1,000 of these cercariæ may be derived from one embryo, so that as each fluke may produce 40,000 ova and each ovum 1,000 cercariæ, a single fluke might give rise to 40,000,000 potential flukes. Fortunately conditions favourable to such development rarely obtain. If moisture or temperature, or the special snail is not available, no further development is possible.

The mollusc accredited with being the sole intermediary bearer of the fluke embryo in Great Britain, is the small snail, known as the *Lymnœa truncatula,* a variety, about the size of a grain of wheat, which has a wide distribution in Europe, and lives only in fresh water. It may be here remarked that it is most improbable that sheep become infested with fluke by eating small snails. The fact of their being herbivorous and most discriminating feeders, is against the popular assumption.

This snail has not been recognised in Australia, where Liver Rot in sheep is by no means uncommon, so that it cannot be taken for granted that the *lymnœa truncatula* is the only snail which provides conditions suitable for the development of the fluke embryo. It has been assumed that a fresh water snail is essential and that, as such do not inhabit salt marshes, these situations are safe, *i.e.*, that Liver Rot cannot be acquired by animals grazing on them. Recent serious occurrences of this disease on salt marshes in South Wales might appear to call for modification of our views on the point as to whether a fresh water snail is exclusively the intermediary bearer. In this connection it must be borne in mind that infestation of the animals may have taken place before being brought on to salt marshes, or by grazing at their borders where fresh water conditions prevail, and it is known that sheep may become seriously infested by grazing in a badly infested pasture a very short time.

Snails breed, sometimes at two periods, through the warmer weather, *i.e.*, from April to August and become infested with embryos at this season. In early autumn and winter the cercariæ pass out and probably it is then that they are mostly taken by sheep, cattle, etc. They are, however, known to retain their vitality on blades of grass for a considerable time, so that animals may become infested through the winter months, and, indeed, at any period of the year. The eggs passed by flukes may also retain their vitality for long periods, and if in dry situations remain dormant for months and on the occurrence of favourable conditions proceed with their development. Frost is said to kill cercariæ.

It is generally recognised that wide-spread Liver-Rot occurs more frequently during wet seasons and particularly when wet summers follow mild winters, also in certain situations, which are favourable to the accumulation of surface water, more or less constantly, and formerly one frequently heard of rotting meadows.

Consideration of the various phases in the life-history of the fluke indicate that preventive measures must be directed to rendering conditions unfavourable to the existence of the essential snail on pastures. Drainage, cleansing out of pools, ditches, etc., indeed, every practical means for averting accumulation of surface water should be adopted. It has been suggested that certain snail-eating animals, as the domesticated and wild duck, plovers and wagtails, and frogs should be encouraged to feed on snail-infested pastures. Doubtless the presence of these may be desirable, though it is not easy to discover how it can be accomplished by artificial means.

Keeping sheep off low-lying, wet pastures, and placing them on high, dry land, especially during the winter months, is advisable where it may be practicable. Clean, fresh drinking water should, if possible, be provided. Incidentally conditions unfavourable to snails must also be so to the short-lived free swimming embryo.

When pastures are known to be dangerous owing to the common occurrence of Liver-Rot in sheep and accumulation of surface water cannot be avoided, it is recommended to spray them with a chemical solution deleterious to snails but which is not injurious to pasture or to animals which may afterward be turned on them. Blue Stone (Sulphate of Copper) has been used for this purpose. On the assumption that this special snail lives only in fresh water, dressing with common salt, about 10 cwt. to the acre is indicated.

Though prevention is the desideratum it is to be feared that perfection will not soon be attained and that cases of Liver-Rot will still exist to be dealt with, and it may be expedient to remark that curative treatment with doses of powdered areca nut appears from the results of experiments, notably those carried out at the Ministry of Agriculture, to be efficacious in expelling flukes from infested animals, but where there is evidence of a large proportion of a flock being infested, the advisability of disposing of the whole to the butcher should be considered before there is much loss of condition.

III.

The part played by *Ticks* in the causation of *Red Water* of cattle affords a striking example of a parasite, which, without itself suffering appreciable injury, acts as a carrier of disease germs, which it transmits to healthy farm animals, in which serious disease is, as a consequence, set up.

The Tick, a relatively large mite, belonging to the sub-family *Ixodes*, is found on the skin of the horse, ox, sheep, dog and animals of other species. The sexes are separate, the male being slightly smaller than the undistended female, which, as a result of gorging herself with the blood of her host, becomes distended to three or four times her ordinary dimensions, often becoming as large as a small horse bean, to which there is some slight resemblance. In the adult state the parasites have eight legs, thus differentiating them from the more common sheep louse, or " Ked," often called the " Sheep tick " which possesses only six legs.

In animals of all species on which ticks are parasitic, they set up irritation by inserting their beaks deep into the substance of the skin of their hosts and the anchoring arrangements connected with the piercing apparatus is such that the parasite has a hold so firm that in forcible attempts to remove it the head is often broken off, remains in the skin and sometimes gives rise to abscesses. The tick also sucks and lives on the animal's blood. The direct effect will depend on the numbers attacking the host ; when numerous the systemic, in addition to local injury, may be severe. In Great Britain the number of ticks found on individuals is usually not great, and though their presence on cattle is undesirable the damage actually sustained as the result of mechanical injury and their blood sucking, cannot be regarded the most serious of their activities.

The relation of ticks to Red Water in Cattle is, however, of great interest and importance. This disease, the cause of which, until recently remained obscure, has been shown to be due to piroplasms, microscopic organisms, which inoculated into cattle, attack the red corpuscles and set free their red colouring matter, which appears in the animal's urine. This most striking symptom has given rise to the common name of Red Water, now technically known as Piroplasmosis.

Ticks are widely distributed over the globe. There are ticks of various genera and piroplasms of different species. It appears that the disease set up by piroplasms of one species is not identical with that set up by another, for instance, the piroplasm which produces Red Water in cattle does not induce the disease in sheep, though it is believed that a piroplasm special to sheep does produce piroplasmosis in them. Advantage is taken of this to use sheep as collectors of infected ticks from cattle. It must be borne in mind that ticks are the carriers of the disease germ, which possibly may undergo some essential change while within them, but ticks free from piroplasms do not cause Red Water. It is only in the blood withdrawn from an infected animal that the germs exist. In America ticks are carriers of the piroplasm which cause Texas Fever of cattle, and in South Africa that responsible for Rhodesian Fever.

The female tick plays, perhaps, the more important part in spreading the disease. When an adult has gorged herself with the blood of her host she drops to the ground, discharges an enormous number of eggs, and after a while, dies. If conditions are favourable, the egg becomes a larva having six legs with hooks at their extremities, which are used to attach it to some grazing animal, from which it takes a large meal of blood, and after five or six days' residence on this host drops off on to the ground, where it undergoes some developmental changes *inter alia* acquiring another pair of legs and becomes the nymph, which repeats the procedure and develops into the adult parasite, which, if fortunate enough, attaches herself to another host, where she meets the male tick, and is fertilized ; so the life cycle is completed. Apparently, though the phases are as above stated in the case of some ticks, the full development is gone through, in the case of others whose larvæ attach themselves to a host and remain on it until the adult stage is reached.

It is now generally accepted that the eggs of a tick, which has sucked the blood of an animal affected with Red Water, contain piroplasms, and that these are passed on to the larvæ which are then capable of communicating the disease to healthy animals to which they become attached. In the phases of larvæ, nymphs and adult ticks they may be capable of infecting cattle with piroplasms obtained originally from the egg or from infected animals as larvæ and nymph. The result of experiments have definitely proved that larvæ can induce the disease. The symptoms of Red Water may be manifest in about two or three weeks after infection.

It is of very great importance to realise that the blood of animals which have recovered from Red Water contain the piroplasms for a long time after apparent return to normal health, and so remain a source from which ticks may draw a supply and be a means of maintaining them in the original situation, and if removed therefrom of spreading the disease to herds into which they may be introduced should ticks be available there.

Red Water, though met with in cattle in many parts of Great Britain, is usually limited to certain localities, determined to some extent by the existence or non-existence of ticks, and it is noted that rough, scrubby pastures and coarse herbage appear to be congenial to their existence. Ticks are more plentiful in spring and late autumn, but before ticks can infect healthy animals they must contain piroplasms. Cattle affected with Piroplasmosis generally, though not invariably, pass red urine, have a high temperature, lose condition, become constipated and hide-bound and generally show evidence of malnutrition. The milk yield of affected cows is usually much decreased. Probably a good many cattle are infected with piroplasms, and do not pass red urine, perhaps, on account of some natural or acquired resistance. Red Water is sometimes met with in cows soon after calving, which act, it is assumed, may have broken down that resistance and allowed the piroplasms to operate effectively.

In adopting preventive measures the natural history of Red Water suggests the eradication of ticks, a desideratum not easily accomplished. Dipping infested cattle has been largely resorted to in countries where Red Water is much more fatal than in Great Britain, and apparently with varying success. Sheep pastured alone or with cattle on infested lands may act as "tick traps," and be dipped periodically with a view of killing the collected parasites. This plan appears to be safe for sheep, which are believed to be insusceptible to disease from the piroplasms which cause Red Water in cattle. Cutting rough herbage and burning it is sometimes resorted to with the idea that many ticks are destroyed by that means, but it is doubtful if the results warrant the trouble and cost.

As the piroplasm probably does not flourish or does not acquire the power to set up the disease unless it pass through the tick, which has sucked bovine blood, it would appear that keeping the infested pasture absolutely free from bovines for long periods, eighteen months or more, and stocking the land with animals insusceptible to Bovine Red Water, or ploughing and cropping where practicable, are probably the most radical measures.

It has been observed that cattle bred on farms on which Bovine Red Water is indigenous, are less liable to suffer severely than others, which have never been subjected to the risks of infection. A method of protective inoculation has been elaborated, and under some circumstances proved of service. This method consists of injecting the blood of an animal recently recovered from Bovine Red Water into healthy cattle. Unfortunately the blood of the recovered animal usually contains living piroplasms, consequently the blood of the inoculated animal will also, and ticks attacking it will become infested. This procedure may be warranted where animals are to be introduced into situations where serious forms of piroplasms are existent. As before stated, Bovine Red Water may be induced by piroplasms of more than one species and from the highly interesting and valuable experiments carried out at the laboratory of the Ministry of Agriculture it is learnt that the blood to be inoculated with a view of protecting animals, must be obtained from an animal recovered from Red Water caused by piroplasms of the same species.

Curative medicinal treatment of the affection has its votaries, and the administration of certain drugs has been reported on very favourably, but it is doubtful whether any panacea has yet been discovered though, probably, it would not be wise to omit all attempt to cure with medicines.

IV.

Parasites of several different species may infest the same animal at one and the same time. When this occurs, it may be taken to indicate that conditions outside the animal have been favourable to the development of the several species. Indeed, the existence and extent of many parasitic diseases of farm stock depend on circumstances operating in the outer world over the occurrence of which we have no control, but from the influence of which endeavours should be made to keep susceptible animals, rather than to exercise control within the animal. The disparity between the computed number of the progeny, under ideal conditions, of a single worm, and the number of parasites which have an effective existence in animals, is so immeasurably great that natural conditions unfavourable to the development of ova or embryos into sexually mature parasitic organisms must generally prevail.

The continued existence of parasites is maintained by those, which live in their particular hosts in numbers too small to give any definite evidence of their interference with the animal's health. A large proportion of the domesticated animals harbour a few parasites, but the discovery of a worm in an animal does not *per se* prove that the animal is suffering from parasitic disease, except, perhaps, in the case of some very large worms which do not concern us here.

Generally speaking the number and habits of parasites determine the amount of injury. The ova or embryos of most worms must pass out of the hosts before they can develop to that stage at which they can become parasitic. When it is realised that a single tapeworm may discharge 100,000,000 eggs a year, that the progeny of a single fluke may under perfect conditions for development amount to 40,000,000, it is not difficult to conceive that when such conditions exist the eggs and embryos discharged by the small number of worms, referred to above, as constantly harboured by apparently healthy animals, may provide parasites enough to allow of that massive infestation, which often follows, for instance, wet seasons. The more numerous the animals on a given pasture, the greater the number of potential parasites. This may be, and, we think, usually is, the cause of the trouble from "overstocking pastures," particularly with animals of one species, when it gives rise to the expressions "tainted pastures," "sheep sick," etc., and this view is supported by the general observation that frequent change of pasture, especially when enclosures are small and heavily stocked is beneficial.

Parasites of several species deleteriously affect animals of one species only, so that when parasitic disease may be affecting one class of animal in any particular situation animals of that particular class should be kept away from it and other insusceptible animals may with safety be placed there, thus averting infestation and helping to purify the pasture. It is to be remembered that however numerous parasites may be in any situation they must all perish unless appropriate hosts are available. For instance, if horses and other equines ceased to exist the parasites special to them would also cease to exist.

V.

Of the external parasites related to disease of farm animals the mites, or acari, which cause Mange, Scabies, Scab or Itch are, perhaps, of greatest interest, not only because they are responsible for very troublesome diseases, scheduled under the Contagious Diseases (Animals) Act, and considerable financial loss and annoyance, but rather on account of the fact that the life-histories of the parasites are so definitely known and appear to indicate that the adoption and carrying out of measures based on that knowledge should exterminate the species, and so the disease. Scab in sheep, Mange in horses, and Itch in man, all matters of ancient history, have been from time immemorial regarded as loathsome and costly affections, calling forth indignation and severe penalties against affected individuals and the possessors of infested animals, indeed, it appears that diseases now known to be due to these "mites" were among the first to be recognised as contagious.

The acari, or mites, causing disease in farm stock, are of three varieties, technically known as *Sarcoptis, Psoroptes, and Chorioptes.* All varieties possess some features in common, with certain anatomical variations, but in their habits there are very distinctive differences, a knowledge of which should direct the adoption of measures for prevention and cure. Each species of animal has its own variety of acarus, and though mites of one variety may live for sometime in animals of another species, such rarely flourish there. Thus the mange parasite of the horse may be transferred to the human subject and induce in him some disease of the skin, but evidently does not find congenial conditions there and usually "dies out" in a comparatively short time.

Though it may not be safe to state that it is not possible that the acarus, regarded as special to animals of one species, may not live on an animal of another, long experience and recorded observation warrant the assumption that mange in horses and Scab in sheep are due to parasites derived from mangy horses in the one case, and from scabby sheep in the other. These acari may be obtained direct from affected animals or anything contaminated by them, as the parasites are known to live for three or four weeks apart from affected animals and remain capable of inducing the disease if transferred to their natural hosts.

The Sarcoptes are minute acari, invisible to the naked eye, but seen with the aid of a lens magnifying about 10 diameters, and their structure observed if magnified about 100. The sexes are separate. The male lives on the surface of the skin, the female, after being fertilised, bores through its upper layers making minute tunnels in which she deposits her eggs, which proceed to develop into larvæ there and pass out of the tunnel by an opening in its wall. The larva, which now has six legs, develops into a nymph, and is soon metamorphosed into an adult with four pairs of legs. This tunnel is formed by the female in course of half an hour, the eggs usually numbering 15 to 30 having been laid, the egg bearing female dies at the bottom. Her life cycle is completed and her progeny go through the same procedure, increasing the area affected more or less rapidly. The progeny of a male and female are computed to number from 1,000,000 to 2,000,000 in three months.

In considering treatment for the cure and prevention of Sarcoptic Mange it will be realised that medicinal agents applied to the surface of the skin are not likely to reach the eggs or young acari while in the tunnel and that provision must be made for their acting on the eggs or larvæ as they come out of the tunnel, which they leave one by one. Applications of parasiticides to the skin of any animal affected with Sarcoptic Mange must be made at short intervals of two or three days for some time and be persevered in after symptoms of irritation have disappeared. Though it may happen that applications to the parts visibly affected destroy all the parasites and cure the patient, the converse is more general. In attempts of the affected animal to rid itself of the irritation, acari may be transferred from one part of the skin to another, and it is usually more economical to dress the whole surface of the skin from the first. The secret of success, whatever form of treatment be adopted, is thoroughness. Every mite must be killed before a cure is effected or the disease may recur. Arising out of the fact that the acari may live for weeks apart from an affected animal, it is necessary to apply some suitable parasiticide to everything which may have become contaminated. It is found that Sarcoptic Mange of the horse very commonly commences on that part of the skin which bears the harness, which, probably, is often the medium by which the acari are transported from diseased to the healthy.

Psoroptic Mange is caused by a slightly larger acarus, usually just visible to the naked eye, which tends to spread rapidly and to produce scabs, most marked in sheep This parasite pierces and bites the skin causing great irritation and extracts blood from its host. It lives on the surface of the skin and the female deposits her ova there. She does not burrow like the Sarcoptes. A scab is formed as the result of the injury effected by the parasite and by the attempts of the host to dislodge it. Acari are usually numerous at the borders of the scab. This variety is the most common of the acari of the horse and the disease produced by it, and the Sarcoptes are provided for in the Parasitic Mange Orders of 1911 and 1918. The Psoroptes, however, acquire their greatest importance from the fact that parasites of this variety are the cause of " Sheep Scab."

The disease produced by the Psoroptes acting alone may be regarded as readily amenable to appropriate treatment. The adult parasite, the larva and the egg are on the surface of the skin and therefore poisonous agents can be brought into contact with them, which in sheep is comparatively easily effected by dipping. In cases, recognisable as Sheep Scab, there must be eggs unhatched, which are not as susceptible to the effect of the dip as living acari are. These may survive the first dipping and carry on the disease, hence the necessity for double dipping. As the hatching out rarely occurs within seven days of the eggs being laid, the second dipping should take place between the seventh and fourteenth day after the first.

The variety Chorioptes is of lesser importance than the two foregoing. Their habits are similar to those of the Psoroptes. They are found on the lower parts of the limbs of the horse and ox; occasionally in the same situation in the sheep. In the horse their irritation induce those symptoms known as " itchy heels," in the sheep and ox an eruptive condition not commonly recognised.

It is generally held that youth and old age predispose animals to parasitic disease. It is probably true that young and old animals are more seriously affected by parasites than adults, owing to the lower power of resistance possessed by their tissues, and infestation of individuals and species to some extent depends on habit, such as close grazing, which renders animals more liable to ingest parasitic embryos, so often found to exist on the lower parts of the herbage. The frequency of parasitic diseases in sheep may possibly be thus accounted for. However, neither age not habit can be regarded of high importance in comparison with that of external conditions, which exercise dominant influence in determining the development of many destructive parasites and the existence of serious and extensive parasitic disease.

The foregoing general remarks are intended merely to indicate the importance of the study of parasites in relation to disease and the value of scientific research in providing the foundation of measures for the prevention and treatment of destructive parasitic diseases, which in the aggregate are probably more costly to agriculture than is generally realised. The parasites and diseases exemplified are merely illustrations of knowledge which has been acquired and its practical bearing on certain points in the relation of parasites to disease in animals. The importance of an understanding of the life-history of the parasite and its activities lie in its presentation of the phases in its life-history at which attempts to break its life cycle are most likely to succeed.

It has to be confessed that such attempts are not always successful and that measures indicated are not always practicable. There, however, exists much evidence of substantial benefit from this study. It has been before noted that in the disastrously wet seasons, 1879-1881, the decrease of 3,500,000 in our sheep was taken to be due to Liver-Rot. Serious similar outbreaks had been common in previous decades.[1] At this time the researches of A. P. Thomas, of Oxford, completed our knowledge of the life-cycle of the Fluke responsible for this disease, which afforded sound grounds for working on. Since that date successions of wet seasons have been experienced, but no such general and disastrous occurrence of Liver-Rot.

In 1903 the Board of Agriculture issued a pamphlet of warning, and in the following year reprinted Thomas's report, and so gave a very wide circulation to the facts and the measures of prevention most likely to be effectual.

Research on parasites and the diseases induced by them still affords a wide field for enquiry. Some parasites, whose phases of life have been long laid bare, and means for their eradication placed at our disposal, for instance, those of Sheep Scab and Mange in horses, are still with us and apparently uncontrolled.

VI.—KELLNER TESTED IN PRACTICE.

By Gervaise Turnbull,

late Agricultural Instructor, Wilts County Council.

For the benefit of those who are not familiar with the Kellner method of making up rations it may be stated that the amounts and proportions are similar to those found in other tables of food standards, and though they are on the moderate side as compared with the famous tables of Wolff, especially as regards albumenoids, they are not very materially so, and in the Kent County records and elsewhere their correctness seems often to have been vindicated. The matter is a contentious one, however, not so much from the figures given by this famous Continental chemist -who speaks with much authority on all feeding matters—as from his way of using them.

Kellner's idea is simplification. Briefly speaking, the ration is made up in the familiar way according to the carbohydrates, fat, fibre and protein, but only the last is taken separately. The others, as well as the protein, are all reduced to a common denominator in the form of the equivalent feeding value of starch. The proportion between the protein and the starch equivalent is, therefore, on the same basis as the familiar albumenoid ratio, but necesarily the ratio is a trifle wider. It expresses in a conveniently uniform, and wholesale form the sum total of the *digestible* part of the food which is required by a cow weighing 1,000 lbs. for each gallon of milk, and thus facilitates calculations. It is safeguarded by a table prescribing a limit to the total dry matter in a ration and those who care to study the full tables will find other interesting matter tallying with the principles upon which other feeding standards have been drawn up. The fact must not be overlooked that the starch equivalent contains the protein, the formula, therefore, being so much starch equivalent containing so much protein, the amount varying with the size of the cow.

A word of warning should be given. The figures in the Wye table are only averages from Kellner's considerable range limits, and therefore, as Kellner himself says, "in no case are the standards to be treated as cast iron; they are meant to enable the feeder to start with a well-tried average ration, and then he should find out what is most suitable for his own requirements."

The value in practice of the starch equivalent system as a basis of making up rations has been often questioned, though allowed to be more appropriate to milking than to feeding animals. Desirous of putting the matter to the test on a practical basis in a herd of ordinary milking Shorthorns, containing one or two of some claim to pedigree, the writer has worked out the rations fed to the cows

and the milking records of a number of them, to see how far the theory can be substantiated in accordance with Kellner's figures.

The cows are by no means ideal milkers, and on the other hand their comparatively light frames and freedom from rich diet have not encouraged flesh to any extent, though some of them have a somewhat beefy appearance. Not possessing anything out of the common, in fact, in either quantity or quality, broadly speaking, the heifers being brought in to the herd without special care in selection--qualities, these, which refer them to many another herd existing to-day, so they are all the more useful a test.

The figures refer to several weeks' milk records in mid-winter, 1920-21, and the rations were approximately as recorded below. The food was fed under good farm conditions, and occasionally weighed, and the concentrates consisted mainly or entirely of the meals set forth in the table. A fairly uniform diet as regards quantity of concentrates was the rule observed with the herd, consistent with the state of lactation and the milking powers of the cow, the object being to produce as much milk as possible, butter not being an important feature.

The amount of coarse fodder per cow was also uniform, the weights quoted being once or twice checked by the writer, who was very well acquainted with the herd and its management. The cows were allowed out to grass by day and watered in the pastures, a feature of the management being an abundance of fresh air, maintained by the sensible plan of open doors through the night, a system found to act well and to keep off tuberculosis and other illnesses.

The deeper milkers got approximately 8lbs. per day of mixed meal (half palm-nut and half yellow meal), and the others averaged approximately 4lbs., any cake fed instead of meal for a short part of the time (undecorticated cotton) not exceeding about 7lbs. as the whole of the concentrated ration for the heavier milkers and about 4lbs. for the lighter ones. During a short part of the period 10lbs. of oat straw was fed instead of long hay; separate milk records are not available for this period,. but there was not very much falling off noticeable.

The following milk records during the period, taken twice daily, are for the month of February. Some of the December-January ones are also given, and these are interesting for another reason also. During a labour shortage in February, the milking was mostly carried out by inferior milkers, differing from week to week, and showing interesting results given under the heading of February. The weekly totals are shown, and the daily average alongside of it. A short interval separates the two periods, all the weeks being otherwise consecutive. The cows were mostly quite young.

DEEP MILKERS.

	Feb.		Dec.-Jan.	
	Weekly average lbs. milk	*Daily average*	*Weekly average* lbs. milk	*Daily average*
Cow A ..	203		284	
	214	lbs.	327	lbs.
	206	29	368	48
	198		352	
			340	
„ B ..	144		176	
	135	18½	174	24½
	123		169	
	117		169	
„ C ..		18½		26
„ D ..			145	
		15	155	22
			158	——
			153	4/120
				——
				30 av
„ E ..	124			
	127			
	123	17		
	109			
„ F ..	129			
	112			
	122	17		
	113			
„ G ..	194			
	198	26		
	180			
	164			

ORDINARY MILKERS.

		Feb.		Dec.-Jan.	
		Weekly average.	*Daily average.*	*Weekly average.*	*Daily average.*
		lbs. milk		lbs. milk	
Cow ..	A	64		87	
		64	lbs.	108	lbs.
		58	8	89	13
		46		86	
„ B	..	65		70	
		67	9½	52	8
		67		48	
		66		51	
„ C	..	63		80	
		59	7	80	
		43		76	11
		33		66	
„ D	..	124			
		178	22½		
		172			
„ E	..	87		109	
		95	12	117	16
		77		110	
		73		105	
					4/48
					12 av

Of the deep milkers Cow A was fresh calved, and of the ordinary Cow D was also fresh calved, the others in various stages of lactation. The falling off in Cow A is rather remarkable as she was the best milker in the herd, but the dietary was probably too light for her as she hardly received her due share for the milk given. Cow D, in the deep milkers was also one of the best, but her decline was rapid. Cow G was a thin animal, very light in weight.

The weights of some of the animals are appended :—

	Deep milkers.				*Ordinary.*		
	cwts.	qrs.	lbs.		cwts.	qrs.	lbs.
Cow A ..	9	2	22	or 1,086 lbs.			
„ C ..	9	3	4				
„ D ..	9	2	22		8	3	16
„ G ..	7	1	16				

These weights were taken some weeks subsequently, but they and other similar weights taken serve to show the class of animals under survey did not carry much superfluous flesh.

As regards the food, the yellow meal employed was of some interest as representing one of those intermediate products regarding which care is needed. It was not sold as "decorticated." A special analysis showed that it was deficient in albuminoids, and far higher in fibre than the 6 per cent. or so which it should have contained. Examination revealed pieces of fibre that had evidently been put back after decorticating.

The composition was as follows :—

Protein	37.01	(34)
Fibre	13.22	(8)
Carbohydrates	27.00	(26)
Oil..	5.77	(9)
	6.00	

In the figures given digestible constituents (total) appertaining to the ordinary run of the food concerned—shown above in parenthesis—have been assumed, as nothing was known as to the digestibility of the food used. Some allowance must, therefore, be made for the lower quality which the first analysis shows, but the meal was eaten readily.

RATIONS FED.

(1) *Food used.*	*lbs.*	*Digest Protein (true)* *lbs.*	*Starch Equivalent.* *lbs.*
Mangel ..	82	.41	5.74
Straw	4	.04	.76
Hay	14	.56	4.76
Palm Nut Meal	2	.29	1.26
Decorticated Cotton Meal (extracted)	2	.68	1.42
		1.98	13.94
(2) Ditto. using 8lbs. Meal		2.95	16.62
(3) Same as No. 1, with 10lbs. long straw in place of hay ..		1.52	11.08
(4) Do. using 8lbs. Meal		2.49	13.76

The roots were cut, and fed with the 4lbs. oat straw chaff.

Kellner's Rations for a Cow of 1100 *lbs.* (*Wye College*).

	1 gal.	2 gal.	3 gal.	5 gal.
Digestible protein (true) —lbs.	1.26	1.67	2.42	3.52
Starch equivalent —lbs.	8.8	12.1	14.85	20.35

The one gallon ration is from Kellner's own table, which is slightly lower in starch equivalent than the Wye table, noticeably so in the case of three and four gallons.

It is, perhaps, worth noting that in Kellner's own table (small edition) it seems that a higher degree of digestibility is assumed for the food as the milk toll on the cow increases to four gallons, since the total ration remains much the same as with three, also that less starch equivalent (and not more) is required in proportion for each gallon after the first.

But Kellner is not generous to cows, and we find on reference to our herd that this is so, or else they have been over fed, which, as regards concentrates anyhow, was hardly the case. It is interesting here to record the opinion of a noted breeder and dairy farmer, producing high-grade milk, rich in fat, recently given to the writer on the question. His view was that Kellner's rations were no good for a herd of that description, heavy, deep-milking Shorthorns, and that some 50 per cent, should be added thereto. Generous feeding, even when dry (leaving something to work against after calving) he is of opinion pays not only in maintaining appearance and quality in a breeding herd of this kind, but in improving the quantity and quality of the milk as well as the offspring.

ANALYSIS OF RESULTS.

Examining the figures, and using those for December to January where given, and referring to rations (1) and (2), we find Cow D (ordinary milkers), coming near enough to Kellner's figures to justify them if she were not so light. Even about 3lbs. of concentrates would apparently be over-feeding, and few, if any, of the cows mentioned got as little as this.

Turning to the deeper milkers the discrepancy as regards protein between the table figures and the food eaten, would seem to be worse in some cases (notably G), than with the light milkers, though the cows may be more profitable, while the starch equivalent eaten, still considerably in excess of the typical rations, shows a slight reduction for the milk yielded. Cow A comes out much better, and at her best shows that her intake is less than even Kellner's moderate standard. However, she declined pretty quickly, and fell off in condition.

Possibly some waste (internal) was incurred in the large amount of chopped food fed, the appearance of the herd rather suggesting that comfortable appearance combined with low milking, which is said by a good judge to be a sure sign of excess of carbohydrate feeding. And yet they were not fat. G was not one of this sort, and in judging of her record her light weight must not be overlooked.

We must conclude, then, that it seems open to question whether Kellner's standard is high enough to be profitable for an ordinary herd, even though slightly raised, as it has been by those who have recommended it for general use—this after making some allowance for the period when straw was used instead of long hay, and for some inferiority in the meal, though it did not appear to be indigestible.

Suppose we pool the milk of the deeper lot for December-January we get an average of 30lbs., and still the feeding is somewhat beyond the Wye table, though the average weight of the cows is no higher.

An interesting commentary on the feeding question is afforded by the significant fact that on the same farm are a few cows fed on the soiling-system, which milk considerably better, and keep in milk longer, though they are much of the same ordinary run of cows as those under review.

What is the winter feeding of the soiled cows? Much the same rations as regards concentrates, hay and roots, the cake and meal allowance always being on the moderate side. But cabbage is fed in preference to mangel when available. The excellent forage has probably a good deal to do with the easier milk production, which tallies more closely with the Kellner ration. It is worth noting that no straw is fed, and though the roots are fed whole, the greater digestibility and feeding value of the fodder is doubtless one of the contributory causes. Possibly the good effect of the summer and autumn soiling on the milking apparatus of the cow still influences the winter performance when green forage, except cabbage, is discontinued, as that, or some other factor arrests, certainly, the autumn decline which is seen clearly enough in the other herd dealt with above.

The manager believes in giving them plenty of bulky, succulent food, so long as they give a return for it, with concentrates according to the milk given, and not in feeding by set rule.

As to the adequacy of the Kellner ration table there are other factors than quantity to be considered, and it is quite possible that a reduction of concentrates to the table limit might have reduced the milk. And bearing in mind the better results got from the coarse fodder fed to the soiled cows, the carbohydrate excess in the forage of ordinary quality which seems be fed to the other herd (as shown by the excess of starch equivalent over Kellner's standard, though the cows were not fat) prompts the suggestion that it may be indigestibility of the cut fodder so commonly fed to cows in large amounts, together with excess of roots, that is the weakest link in the chain. May not this cause a depressing effect on the digestibility of the whole ration such as may even lessen the supply of milk which should be available, and render some of the food quite unprofitable ?

VII.—THE IMPROVEMENT OF POOR PASTURES.

WITH ESPECIAL REFERENCE TO THE ERADICATION OF BRACKEN.

PROGRESS REPORT, 1923.

Long Ashton Golf Course Plot.

JUNE PLOT.

Dates of Cuttings.	*Particulars of Cuttings.*	*Costs.*
June 6th, 7th ..	One man and two horses, with mowing machine ..	£2 0 0
Aug. 7th ..	One man and two horses, with mowing machine ..	1 0 0
	Total cost of cutting bracken	£3 0 0

JULY PLOT.

Dates of Cutting.	*Particulars of Cutting.*	*Costs.*
July 14th, 15th..	One man and two horses, with mowing machine ..	£2 0 0
	Total cost of cutting bracken	£2 0 0

GROWTH OF BRACKEN DURING THE SEASON.

June Plot.

May 7th.—There were isolated fronds scattered over the plot. They were mostly less than 4ins. in height.

June 3rd.—The number of fronds was less than in previous years, but there was a fair distribution over the plot. The average height was from 6ins. to 9ins.

June 6th.—The first cutting was carried out.

July 1st.—There was a scattering of plants over the plot, mostly from 6ins. to 9ins. in height. These had mostly developed just too late to receive the June cutting.

July 31st.—The growth was not very dense. The height of the fronds varied from 6ins. to 9ins. in certain areas and from 1ft. to 18ins. in others. The latter areas were mostly on the portion of the plot which had been limed, where the bracken was making the strongest growth previous to the commencement of the experiment.

Aug. 7th.—The second cutting was carried out.

Sept. 25th.—There were a few fronds scattered over the plot. There were none higher than 6ins. and they were ripening off.

July Plot.

May 7th.—There were a few fronds, mostly less than 4ins. in height, scattered about over the plot.

June 3rd —There was a fairly dense growth of bracken on the plot, the height of the plants varying from 6ins. to 12ins.

July 1st.—Most of the plants were from 1ft. to 1ft. 6ins. in height.

July 14th.—The first cutting was carried out.

July 31st.—Only a very small number of plants had appeared since the cutting on July 14th.

Sept. 25th.—There were only a few isolated bracken plants on the plot. These averaged from 6ins. to 9ins. in height and were ripening off.

Remarks.

Comparison of the above notes on the growth of the bracken on the two plots during 1923 shows that the bracken plants have not made as much growth as they did during the previous season. Thus in 1922 the average height of the bracken on the June plot on June 6th was from 9ins. to 1ft. 6ins. as against 6ins. to 9ins. on June 3rd, 1923, whilst on July 3rd, 1922, the average height of the plants on the July plot was 2ft. 6ins. as against 1ft. to 1ft. 6ins. on July 1st, 1923. On the July plot it was only necessary to carry out one cutting during the season as in previous seasons.

The plots cannot yet be said to have been cleared from bracken, but the plants have been greatly weakened and further treatment for another season or two on the same lines as previously given ought to result in the complete clearance of the area.

Herbage.

On the areas of the plots where no manurial treatment has been given the herbage shows no decided improvement over its original condition. The herbage on the limed plots is not perceptibly better than the unmanured plots. On the plots which have received basic slag the herbage is markedly improved and leguminous plants are much in evidence. The plots which have been dressed with Nauru phosphate also show improvement in the herbage.

Stocking.

The plot has been accessible to cattle and sheep throughout the season and occasionally to horses and the stock have grazed the slagged plots and the Nauru phosphate plots closely.

Ashton Park Plot.

DETAILS OF CUTTING OF BRACKEN.

Dates of Cutting.	*Particulars of Cuttings.*	*Costs.*
January	3½ acres harrowed	£0 7 0
June 6th	Machine, 3½ acres	0 15 0
July 31st	Ditto, ditto	0 15 0
	Total cost of Cutting bracken	£1 17 0

Growth of Bracken during Season.

May 4th.—There were a few fronds just appearing through the ground scattered about over the plot.

June 3rd.—There were only a very few fronds on the plot. These were about 4ins. to 6ins. high.

June 6th.—First cutting was carried out.

July 31st.—There was practically no bracken visible on the plot.

Sept. 26th.—There was practically no growth of bracken on the plot. Only a few isolated plants about 4ins. high were to be seen.

Oct. 6th.—As for Sept. 26th. The plants were dying down.

Remarks.—

The growth of the bracken on this plot during the season has been very weak, the tallest fronds only reaching a height of 6ins. whilst the number of plants present has been very small.

Some idea of the great effect which the cuttings have had in reducing the strength of the bracken plants on this plot will be obtained by comparing the above notes on the growth of the bracken plants during the season with the following observations on the condition of the bracken plants on the bracken area bordering the treated plot. On June 3rd the plants on the untreated area varied in height from 1ft. 6ins. to 2ft. 6ins.

On Sept. 26th these plants were from 3ft. 6ins. to 4ft. 6ins. high and formed a dense thicket.

Herbage.

The herbage over the whole plot is fairly good and has been greatly improved by the heavy grazing which it has had. The improvement which has been effected by basic slag and to a less extent by Nauru phosphate is very marked. The area is now quite a useful pasture.

Stocking.

The plot was heavily stocked with sheep and some cattle during the season. It was enclosed with hurdles in late May and was stocked with a flock of sheep until late July, during which period the herbage was very closely grazed. During the remainder of the season it was accessible to both cattle and sheep.

Wootton Fitzpaine Estate.

Value.—The value of the fern covered ground is estimated to be worth 12s. per acre, that of the surrounding land 15s. per acre.

Acreage.—The whole of the field measures 13a. 0r. 12p. About 12 acres of this is covered with bracken, and six acres is treated as an experimental plot.

Elevation.—180ft. to 300ft.

Manure.—No manure has been applied since Slag and Nauru phosphate were sown in January, 1922.

Herbage.—The herbage has considerably improved on the acre where slag was sown, clovers being much thicker on this area than on any other part of the field. The acre where "Nauru Phosphate" was sown has shown a slight improvement this year but still falls considerably short of the Slag area.

Labour.—The whole of the experimental area was cut over in June by the Farmer when the bracken was about six inches high. We have no details of the cost of this. The whole area was again cut in July, the bracken then being about an average height of eleven inches, at a cost of £1 18s. 6d.

Stock.—The field has been well stocked with cattle and sheep. These have kept the area very closely grazed especially on the manured plots.

THE EFFECT OF MANURES ON THE BRACKEN AREAS.

The scheme of proposed manurial trials on the plots and the reasons for proposing to carry out these are given in Vol. XVI of this Journal, pages 83, 84.

In accordance with this scheme, manurial plots were laid out at the various centres as under. and the manures were applied to the respective plots in January, 1922.

Long Ashton Golf Course Plot.

1. Two plots each ½ acre in area—one on the June Bracken plot, one on the July Bracken plot—were dressed with high grade basic slag to supply 150 lbs. of phosphoric acid (P_2O_5) per acre.
2. Two plots, area, etc., as in 1., were dressed with Nauru phosphate to supply 150 lbs. of phosphoric acid (P_2O_5) per acre.
3. Two plots, area, etc., as in 1, were dressed with ground burnt lime at the rate of 72 cwts. per acre, *i.e.*, equal to ground carbonate of lime at the rate of 6 tons per acre. This was the amount calculated to correct the "lime requirement" of the soil.
4. Unmanured plots were left as controls between the plots receiving the manures.

Ashton Park Plot.

1. One plot, 1 acre in area, was dressed with basic slag at rate as for Golf Course plot.
2. One plot, 1 acre in area, was dressed with Nauru phosphate at rate as for Golf Course plot.
3. One plot, ½ acre in area, was dressed with ground burnt lime at the rate of 48 cwts. per acre—*i.e.*, at rate calculated to correct the "lime requirement."
4. Unmanured plots were left as controls.

Wootton Fitzpaine.

1. One plot, 1 acre in area, was dressed with basic slag at rate as for Golf Course plot.

The sample of lime used at the two centres given above was a high grade one.

The same quality of basic slag was used at all centres. It contained 36% total phosphates.

The sample of Nauru phosphate used was guaranteed to contain 84% to 86% total phosphates. It was stated that the fineness of grinding was such that 80% to 85% of the material would pass through a sieve with 100 meshes to the linear inch.

This last point should be borne in mind in considering the results obtained with this material as it has been shown lately by Gilchrist and others that it is desirable to grind mineral phosphates sufficiently fine to pass through a sieve with 120 meshes to the linear inch to obtain the best results with them.

RESULTS OBTAINED.

Golf Course Plot.

The first response to any of the manures was noted in September, 1922, when it was noted that the stock were grazing the slagged plots more closely than the remainder of the area, whilst on the June slagged plot white clovers were beginning to grow strongly.

On April 1st, 1923, when the first visit of the season was paid the herbage on the slagged plots, looked a much brighter green than on the rest of the plots where the grasses looked dull and poor. Clovers were much in evidence on the former plots and they appeared to be the only plots which the stock were grazing to any extent.

From this date to the end of the season, the slagged plots have looked much better than any of the others. The stock have grazed them very closely and they have stood out very clearly against the unmanured plots.

Wild white clover has spread very vigorously over the plots and there is a good plant of bird's foot trefoil on them.

The Nauru phosphate plots began to show some improvement during May and since then there has been a fair development of leguminous plants—especially white clovers and bird's foot trefoil in patches on both plots, especially on the June plot where the original herbage was not very coarse.

The limed plots do not appear to have been much improved by the treatment. There is very little more clover on these plots than on the unmanured plots though the grasses look a rather brighter green than on the unmanured plots. The stock have shown no preference for the herbage of these plots over that of the unmanured.

Ashton Park Plots.

The effects of the dressing of basic slag were noted as early as May, 1922. The stock on the plot at that time had eaten most of the original rough grass from the plot and wild white clover plants were spreading vigorously over most of the plot. The plot then stood out in sharp contrast from the unmanured strips on either side of it. Since that date to the end of the present season this plot has been covered with clover and has been kept grazed very short.

No other treatment produced any marked change in the character of the herbage during 1922.

During 1923 the plot was heavily stocked. It was enclosed with hurdles during late May and a large flock of sheep were kept on it from that date until late July. As a result of this the herbage of the whole plot has been greatly improved and even the unmanured plots have now quite a good plant of clover on them though there still remain patches of Yorkshire Fog and Bents which have not been eaten.

A considerable amount of clover was in evidence on the Nauru phosphate plot in May and the grass on this plot was eaten well down.

The herbage on the limed plot as on the Golf Course plot does not appear after two seasons to differ to any noticeable extent from that on the unmanured plots. The amount of clover present is about the same, the grazing has not been any better though the grass at times did appear to look rather greener and finer than on the unmanured plots,

Wootton Fitzpaine Plot.

At this centre a certain amount of white clover and bird's foot-trefoil was noted on the slagged plot early in 1922, though the effect was not very marked.

During 1923, however, the herbage on the slagged plot has improved rapidly. The plots have been heavily stocked with cattle and sheep and the stock have grazed the slagged area very closely and clovers have spread in patches over the whole of the plot. The herbage on this plot as at the other centres is a much brighter green than on the other plots.

The Nauru phosphate plot even at the end of the 1923 season did not appear to differ in appearance from the unmanured plot, both plots still having a considerable proportion of their areas covered with poor matted grass.

SUMMARY.

The results obtained at the three centres may be summarised as follows :

1. Basic slag appears to have produced marked improvement to the herbage at all centres. Following its application the stock have grazed the plots very closely and have eaten off all the poor coarse grasses originally covering the plots. The herbage at all centres during the second season after application contained a large proportion of leguminous plants—chiefly white clover.
2. Nauru phosphate in the second season after application stimulated the growth of the leguminous plants on the plots at two centres and effected improvement of the herbage at these centres, though the result obtained appears to be much smaller than that obtained by basic slag. At the third centre—Wootton Fitzpaine—Nauru phosphate does not appear to have produced any visible effect on the herbage after two seasons.
3. The application of lime at two centres has not resulted in marked development of leguminous plants to date, nor have the stock grazed the herbage of these plots more than where no manure was given. The grass on the limed plots, however, is a brighter green colour than on the unmanured plots.

IMPROVEMENT EFFECTED BY THE TREATMENT APPLIED.

Owing to the variations in rentable values which occur from year to year, and have been especially marked between 1920 and 1924, it would give no criterion of the value of the treatment applied to state the presumed rentable value of the plots at the beginning and end of this period. It has, therefore, been decided to estimate as far as possible the improvement in the rentable value of the plots when compared with immediately adjacent land which has not been treated. These figures are given below, together with the costs of treatment to date.

	ASHTON GOLF COURSE.				ASHTON PARK.		WOOTTON FITZPAINE.	
	June Plot.		July Plot.					
	Costs	Acreage	Costs	Acreage	Costs	Acreage	Costs	Acreage
Bracken cutting, harrowing, etc.	£ s. d.		£ s. d.		£ s. d.		£ s. d.	
1920		6.5		6.5	2 10 0	5.		6.
1921	8 14 0		7 8 0		3 7 0		2 8 10	
1922	5 11 0		4 9 0		1 10 0		2 7 6	
1923	3 10 0		2 10 0		1 17 0		3 4 6	
Total..	£17 15 0		£14 7 0		£9 4 0		£8 0 10	
Cost per acre ..	£2 14 7		£2 4 2		£1 16 9		£1 12 2	
Cost and application of Manures:—								
Ground Lime ..	£4 5 6	.5	£4 5 6	.5	£2 17 0			
Basic Slag ..	1 6 4	.5	1 6 4	.5	2 12 8	1.	2 12 8	1.
Nauru Phosphate	0 18 3	.5	0 18 3	.5	1 16 6	1.	1 16 6	1.
Labour	2 0 0	1.5	2 0 0	1.5	2 10 0	2.	1 13 4	2.

*ESTIMATED IMPROVEMENT EFFECTED ON ASHTON PARK PLOT FROM CUTTING OF BRACKEN AND APPLICATION OF THE VARIOUS MANURES.

	£ s. d.
(1) Improvement due to cutting of bracken per acre	0 15 0
(2) .. ,, application of basic slag per acre	0 7 6
(3) ,, ,, application of Naru phosphate per acre ..	0 2 6
(4) ,, ,, application of ground lime per acre	Nil

*ESTIMATED IMPROVEMENT EFFECTED ON LONG ASHTON GOLF COURSE PLOT FROM CUTTING OF BRACKEN AND APPLICATION OF VARIOUS MANURES.

	£ s. d.
(1) Improvement due to cutting of bracken per acre	0 5 0
(2) .. ,, application of basic slag per acre	0 5 0
(3) ,, ,, application of Nauru phosphate per acre	0 2 6
(4) .. ,, application of ground lime per acre ..	Nil

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* Kindly judged by T. H. Pearce, Esq., Parsonage Farm, Long Ashton.

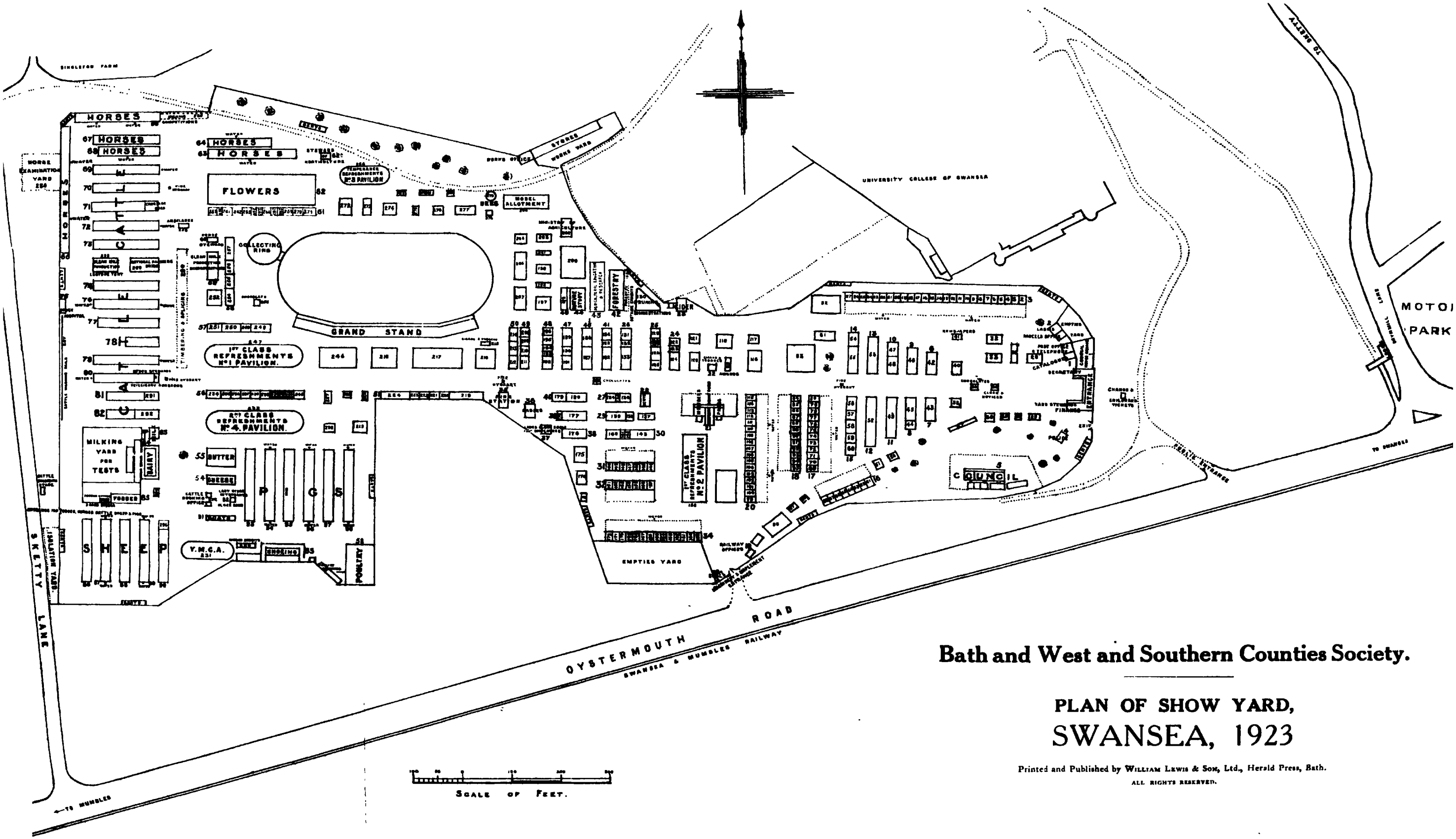
VIII.—THE SOCIETY'S EXHIBITION AT SWANSEA.

By F. H. Storr.

For the second time in its history the Society had the honour of welcoming a Royal President in the Show Yard. The visit of H.R.H. The Prince of Wales in the second term of his Presidency, to Singleton Park, gave the greatest pleasure to the twelve thousand people who attended the Show on that day; the weather was genial, and the Prince displayed a keen interest in all the departments of the Show that he was able to visit. He complimented the Stewards and other officers of the Society in flattering terms on the excellence of the arrangements made, the sole anxiety of the Stewards being to prevent the enthusiasm of the visitors from trespassing on the Prince's freedom of movement.

The Show was opened on May 17th by the Mayor of Swansea, escorted by his guard of police halberdiers, the successors of the halberdiers appointed when Swansea first received its charter. He was received by the Deputy President, Lord Blythswood, and other officers of the Society, and heartily welcomed the Society to Swansea. The ground at Singleton Park, recently acquired by the Corporation, was a great improvement on that previously available, though the heavy rain which fell in the week before the Show made the staging of the heavier exhibits a matter of considerable difficulty, several lorries becoming bogged up to the axles, and requiring a good deal of hard work before they could be extricated. The Stewards, too, had to deal with an unprecedented difficulty, and one which threatened the success of the Show at its start, namely, the failure of the railway company concerned to arrange in the least adequately for the stock exhibits on their arrival. In spite of the most urgent representations many animals were kept for more than 15 hours in the railway sidings, and arrived on the Show Ground so late that judging had to be postponed. The representative of the railway company expressed his deep regret for what had transpired; promised that a thorough investigation should be held, and that adequate arrangements should be made for the outward traffic. He expressed a hope that what had occurred would not prejudice the goodwill of the railway, and agreed that their apology should be read to the Annual General Meeting of the Society.

The stock exhibits, though not particularly numerous, reached a very high standard of quality, this point being remarked on by several of the judges officiating. Large provision had been made for Welsh breeds of cattle, sheep and pigs, but it cannot be said that entries in these classes came up to expectation. On the other



Bath and West and Southern Counties Society.

PLAN OF SHOW YARD,

SWANSEA, 1923

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	SWANSEA.		
	1904	1914	1923
HORSES—(with Boxes)—			
Agricultural	67	46	54
Hunters, Hacks and Ponies	89	61	96
	——156	——105	——150
CATTLE—			
Devons	19	33	30
South Devons	18	26	11
Shorthorns	59	48	54
Dairy Shorthorns	—	—	27
Herefords	69	65	35
Sussex	10	6	8
Red Poll	15	0	15
Aberdeen-Angus	24	22	23
British Friesian	—	—	44
Welsh Black	32	25	20
Jersey	100	91	36
Guernsey	40	50	31
Kerry and Dexter	47	31	46
Dairy	42	37	35
	——475	——434	——415
SHEEP	131	169	173
GOATS	—	—	16
PIGS	158	87	249
POULTRY	335	489	488
FARM PRODUCE—			
Cheese	51	38	45
Butter and Cream	104	86	106
Cider	52	63	56
	——207	——187	——207
	1462	1473	1698

The distribution of the prize money, £4,191 10s. 0d. to the various, breeds and competitions will be found in the previous issue of this journal.

IMPLEMENTS.

The total space taken for exhibits of implements was largely in excess of the two previous visits to Swansea, and the ground available allowed of there being accommodated to greater advantage. In fact, the Society's Superintendent of Works may be said to have achieved the impossible in that no exhibitors seriously complained of his position or of the lay out of the ground, though an excess of rain previous to the Show was a cause of dissatisfaction in at least one case. The occasion was notable for another record, a steam digger on caterpillar wheels, being the heaviest exhibit ever shown at a meeting of the Society. The comparative figures for the three last Swansea Shows are as follows :—

		SWANSEA.		
		1904	1914	1923
Machinery in Motion	feet run	1358	1512	1442
Agricultural Implements	,,	3085	*2675	1595
Other Exhibits not strictly Agricultural	,,	950	340	320
Seeds, Cattle Foods, Artificial Manures, etc.	,,	847	1111	1137
		6240	5638	4494
Open Space for Farm and Horticultural Buildings, etc.	sq. feet	20644	27206	49413

GENERAL REMARKS.

Special attention was paid this year to the improvement of the accommodation for members. The site chosen for the members' pavilion was on the main avenue and in the most central position in the Show Yard. The members' refreshment pavilion was placed immediately behind the building. These arrangements were undoubtedly much appreciated, the building being more frequented than usual, and more than 100 members made use of the luncheon accommodation on the first two days of the Show. Incidentally the members' dining room was used to entertain 15 secretaries of South Wales Show Societies, who had held a meeting in the Show Yard to discuss matters of mutual interest, an innovation that may prove of permanent value.

Three addresses were delivered in the Show Yard, viz., by Prof. R. G. Stapledon, on "Varieties and Cultivation of Oats," by Mr. C. Crowther on "Pig Feeding," and by Mr. J. J. Griffiths on "Lime and Liming." The addresses secured a better attendance than was the case in previous years, while there has been a larger demand for them subsequently, in addition to the copies distributed to members of the Society.

Owing to the support of a strong Local Committee, under the Chairmanship of the Mayor of Swansea, it was possible to arrange buildings and staff on a greatly increased scale for the demonstration of Clean Milk Production. This work was again undertaken by the National Institute for research in Dairying. Two cows were stalled in the buildings, which were divided into washing, cooling and bottling compartments. Mr. W. A. Hoy, of the Institute, spoke several times a day on every part of the process of milk production and was assisted by members of the Glamorgan Agricultural Staff. This was only part of the work undertaken by the Glamorgan County Council through their County organiser, Mr. Davidson. An excellent model allotment was prepared in the Show Yard, which contained a good variety of growing vegetables, in spite of the late and inclement spring. Help was also given with the Society's Working Dairy.

The Flower Tent must have provided a display approaching a record, not only in the quantity but also in the quality of the exhibits, thanks to the energy displayed by the Steward in his first year of office. and his assistant, Mr. O. J. Fewtrell. This was one of the departments in which H.R.H. The Prince seemed to be most interested, in addition to the Pure Milk demonstrations and the Shoeing competitions.

COMPETITIONS.

Entries in the competitions were good, though those for timbering and splicing were not up to the record of previous visits to Swansea, owing to the concurrent competitions held at local shows in the near neighbourhood. A high level was, however, reached by competitors in this and in the Buttermaking and Shoeing classes. The thanks of the Society are especially due to the Assistant Stewards in these competitions and to those who supplied the timber and rope and other requisites.

ENTRIES IN COMPETITIONS FOR MEN AND WOMEN.

	SWANSEA.		
	1904	1914	1923
Butter-making (Entries now limited)	135	212	105
Milking	12	17	21
Shoeing	117	102	100
Timbering and Splicing	37	24	15
	301	355	241

ATTENDANCE.

The seal was set on what must otherwise be admitted to have been an outstanding success by a truly remarkable attendance, a record in the annals of the Society. The record for a single day still remains with Bristol in 1874, though the Society's officers were hard put to it to deal with the 53,000 people paying for admission on Whit Monday. To relieve the pressure on the turnstiles the three gates at the main entrance were opened to the visitors, whose good behaviour and good nature were the objects of universal commendation. If the reasons for this attendance are looked for, apart from the general attraction of the Show, the chief one was undoubtedly the presence of the Royal President, and second the coincidence of the Show with the Whitsun Holidays. The weather, too, was kindly disposed, for, in spite of cold and stormy conditions, no rain fell during the hours the Show was open, sufficient to be any real inconvenience to the visitors.

NUMBERS OF ADMISSION, SWANSEA.			ADMISSION RECEIPTS, SWANSEA.		
1904	1914	1923	1904	1914	1923
78,827	85,762	115,345	£5,591	£5,977	£14,880

IX.—REPORT ON THE SOCIETY'S DAIRY DEPARTMENT AT SWANSEA.

By A. F. Somerville, Steward.

The Dairy Department was divided as follows :—

1.—*Produce Department.*—For exhibits in sheds of cheese, butter and scalded cream.

2.—*Working Dairy.*—For butter-making competitions and demonstrations, given by members of the Staff.

3.—*Test Department.*—For the "Butter Test" and "Milking Trials."

4.—*Sales of Produce Department.*—Where milk and its products made in the Working Dairy were sold in "The Pavilion" adjoining the Dairy.

5.—*Milking Competitions.*—For men, women, boys and girls.

The *Produce Department* was under the control of Mr. A. H. Gibbs, as Steward, and the exhibits were judged : cheese by Mr. A. Todd, British Dairy Institute, Reading ; cream cheese, butter and cream by Mrs. E. Hughes, Buckland Home Farm, Bwlch, Breconshire.

The *Working Dairy* was under the control of Mr. A. H. Gibbs, as Steward, with Miss M. Bowen, Dairy Instructress for the Glamorgan Agricultural Committee, as Chief Assistant, and she was helped by Miss E. E. Jones and Miss A. Pritchard, Dairy Instructresses for the Carmarthen Agricultural Committee. Miss D. G. Saker, Somerset Farm Institute, Bridgwater, was the judge for the Butter-making Competitions.

For the *Test Department*, Captain E. A. B. Clive was the Assistant Steward. Miss H. M. Williams, on the staff of the Glamorgan Agricultural Committee, had charge of the churning for the Butter-test, and Mr. H. Rhys Williams, Agricultural Instructor for the Glamorgan County Agricultural Committee, tested the milks in the Milking Trials by the Gerber Tester; the judging of both being carried out by myself. This was the first time that the Society undertook the testing of the milks, it having been agreed that a standard of butter fat, as shown by the Gerber Tester, should take the place of the full analysis which had in previous years been made by Dr. J. A. Voelcker, 3 per cent. butter fat at each milking being the necessary qualification.

The *Sales of Produce Department* was again under the control of Miss M. C. Taylor, from the Staff of the Somerset Agricultural Committee, who was assisted at "The Pavilion" by Miss E. M. Masters and Miss M. Mackie, students under that committee; while Mr. V. Read, Bath, and Captain E. A. B. Clive again undertook the whole of the arduous work of purchasing the milk, distributing it and the dairy products, and keeping the accounts.

WORKING DAIRY.

On the first day demonstrations were given in the making of scalded cream, cream cheese, Pont L'Eveque and Colommier soft cheeses, Small Holders' Caerphilly and Junkets, and in the afternoon there was a butter-making competition for children under 14. Only one competitor entered, Miss L. G. Thomas, to whom a first prize was awarded.

On the second day similar demonstrations to those on the first day were given in the morning, and we were honoured by a visit from our President, H.R.H. The Prince of Wales, to whom the members of the Staff were presented and the various products of the Working Dairy shown. In the afternoon there was a butter-making competition for men and women, *bona fide* workers on a farm, for which 20 entered.

On the third day demonstrations were given in making scalded cream, cream cheese and junkets, and there were two butter-making competitions. In the morning, for students from the University College, Cardiff, for which there were 17 entries, and in the afternoon for students who had attended a course of instruction at any County Council School, for which there were 20 entries.

On the fourth and fifth days similar demonstrations to those of the previous days were given and there were two competitions, in the morning for Students from the Glamorgan County Council Travelling School Dairy, for which there were 20 entries, and in the afternoon an open class for men and women with 20 entries.

The cream for the butter-making competitions was obtained from the West Cornwall Creameries, Ltd., Lelant, Cornwall, at 11s. 3d. per gallon delivered at Swansea. It was delivered punctually and was of excellent quality, producing over 5 lbs. of butter to the gallon of cream. For all the competitions except the "Medal" class, each competitor was given five pints of cream; for the "Medal" class eight pints. Great interest was taken by the public in both the competitions and demonstrations and during the whole time there was a very large attendance at the "Working Dairy."

TEST DEPARTMENT.

The cows in the Milking Trials and Butter Tests were stript on the first day of the Show at 5 p.m. and 5.30 p.m., and milked the following day at 7 a.m. and 7.30 a.m. and again at 5 p.m. and 5.30 p.m., for "first" and "second" milking respectively. As stated previously, samples for the Milking Trials were taken and tested with the Gerber Tester by Mr. H. Rhys Williams, immediately after the milking.

The cows competing in the Milking Trials were divided into two classes :—

Class 132 for Cows under 950 lbs. live weight.
Class 133 for Cows 950 lbs. live weight and over.

The prizes for these classes were given by the Society and in addition a prize of £50 was given by the British Friesian Society to the owner of the cow obtaining the greatest number of points in Class 133, provided that such cow was a British Friesian.

In Class 132 five cows, all Jersey, competed; in Class 133 there were 14 cows, of which seven were Devons, six British Friesians, and one Jersey. Only one cow in these classes failed to reach the 3 per cent. Butter fat standard in the morning, and none were below it in the evening.

The cows in the Butter Tests were divided into two classes: Class 134 for Jerseys, the prizes, Gold Medal or £10, Silver Medal and Bronze Medal, being given by the English Jersey Cattle Society; Class 135, for Guernseys, the prizes, £5, £3 and £2 being given by the English Guernsey Cattle Society.

The preceding tables give the results for the Milking Trials and Butter Tests.

MILKING TRIALS.

The average yield of the cows in the various breeds, together with the average number of days in milk and butter fat, is given in this table :—

Breed.	*No. of Cows.*	*Yield.*	*Days in Milk.*	*B.F.*
Jersey	5	39·57 lbs.	108·2	4·98
British Friesian ..	6	52·41	59·8	3·85
Devon	7	39·48	89.5	4·08

The British Friesians produced richer milk than has been experienced in former tests by the Society, and in four cases Devon cows gave almost exactly the same butter fat at each milking.

SALES OF PRODUCE DEPARTMENT.

The amount of milk obtainable from the cows in the yard was below the average of the last three years, and practically all the milk and products made from it were sold direct to the public at "the Pavilion," no contractors being supplied as on former occasions. In addition all the butter made from the cream which had been bought for the Butter-Making Competitions, found a very ready sale at "the Pavilion" at 2s. 3d. per lb., and there was a great demand for junkets, soft cheeses, scalded cream, etc., made at the Working Dairy, and on the last day the whole of the prize cheeses, butter and surplus butter taken by the Society were easily disposed of. A substantial balance to credit was the result of the operations of this department.

MILKING COMPETITIONS.

The cows for these competitions were kindly provided by Mr. J. Harris, Singleton Park Farm, Swansea, and as with the exception of Class 253, a local class for Glamorgan students, the entries were very few, the competitions in the first three classes were held at the farm where the cows were kept. Class 253 was held in the Show Yard, the 14 competitors being divided into two sections, seven in each ; this class attracted a considerable attendance of the public. Mr. S. J. Knight, Keynsham, Bristol, was the judge.

Though the "Clean Milk Demonstrations" was another department unconnected with the Dairy, the public were shown at the latter the advantages of using a cooler and also filtering the milk. For the latter a patent filter, lent by Mr. A. J. Clare, Wells, Somerset, was used, and an analysis of some dirty milk passed through the filter showed that all dirt had been removed and a milk with a low bacterial count had been obtained : all the milk sold at "the

MILK TEST.

FOR COWS UNDER 950LBS LIVE WEIGHT.

No.	Owner and Cow.	Breed.	Date of Birth.	Date of last Calf.
	CLASS 132			
403	R. Bruce Ward's "Prometheus' Queen"	Jersey	25/3/20	7/1/23
407	G. Cross's "Eastern Queen Laxton"	Jersey	15/2/17	15/10/22
409	Major A. W. Huntington's "Tussore Lassy"	Jersey	6/5/18	9/3/23
410	E. A. Straus. M.P., "Derry's Fairy"	Jersey	16/5/16	21/1/23
490	Mrs. H. Briggs's "Lily of the Valley"	Jersey	26/11/17	24/4/23

MILK TEST.

FOR COWS 950LBS. LIVE WEIGHT OR OVER.

No.	Owner and Cow.	Breed.	Date of Birth.	Date of last Calf.
	CLASS 133			
135	Mrs. W. G. Busk's "Wraxall Dairymaid 2nd"	Devon	3/3/16	16/2/23
136	Mrs. W. G. Busk's "Wraxall Bluebell"	Devon	1915	27/4/23
137	J. H. Chick's "Wynford Dahlia" ..	Devon	15/1/20	1/3/23
138	J. H. Chick's "Cherry 3rd" ..	Devon	1/4/11	21/1/23
139	W. D. Chick's "Compton Carmine 3rd"	Devon	27/2/13	26/11/22
141	N. D. Lupton's "Daisy"	Devon	4/7/18	1/2/23
142	N. D. Lupton's "Bryanston Rebecca"	Devon	9/12/09	10/4/23
337	A. and J. Brown's, "Hedges Dutch Garter"	B. Friesian	10/11/16	4/2/23
345	G. Holt-Thomas's "Colton Sunray"	B. Friesian	31/10/18	23/3/23
347	J. Lewis's. "Rhydbroughton Bramble"	B. Friesian	9/5/17	10/5/23
401	R. Bruce Ward's "Ida"	Jersey	14/3/14	19/3/23
491	A. and J. Brown's "Lacton Ella" ..	B. Friesian	28/3/19	30/4/23
493	G. Holt-Thomas's "Terling Glossie 5th"	B. Friesian	8/9/13	3/12/22
494	W. Turner's "Hawthorn Agnes" ..	B. Friesian	1/10/17	2/5/23

Milk Test.

For Cows under 950lbs. Live Weight.

Days in Milk.	Milk Yield.		Lactation.	Total.	Awards.
	lbs.	oz.			
130	37	8	9·0	46·500	First Prize
214	32	0	12	44·00	Second Prize
69	Withdrawn.		2·9		
115	51	0	7·5	58·500	Fat below standard
23	33	8	Nil	33·500	Third Prize

Milk Test.

For Cows 950lbs. Live Weight or over.

Days in Milk.	M’lk Yield.		Lactation.	Total.	Awards.
	lbs.	oz.			
90	35	2	5.0	40.125	
20	51	2	Nil	51·125	H.C.
77	36	6	3·7	40·075	
116	33	8	7·6	41·100	
172	34	8	12	46·500	C.
105	45	12	6·5	52·250	H.C.
47	41	0	·7	41·700	
102	45	10	6·2	51.825	H.C.
56	62	8	1·6	64.100	Third Prize
7	25	4	Nil	25·250	
59	43	14	1·9	45.775	C.
17	58	4	Nil.	58·250	Reserve.
165	53	0	12	65·00	Second Prize
12	69	14	Nil.	69·875	First Prize

BUTTER TEST.

PARTICULARS OF COWS TESTED, YIELDS OF MILK AND BUTTER, AWARDS, ETC.

No	Owner and Cow.	Date of Birth.	Date of last Calf.	Milk Yield in 24 Hours.	
	CLASS 134—JERSEY.				
				lbs.	oz.
*400	Major A. W. Huntington's "Patience" ..	14/1/20	12/5/23	26	2
401	R. Bruce Ward's "Ida"	14/3/14	19/3/23	43	14
403	R. Bruce Ward's "Prometheus' Queen" ..	25/3/20	7/1/23	37	8
407	G. Gross's, "Eastern Queen Laxton"	15/2/17	15/11/22	32	0
409	Major A. W. Huntington's "Trussore Lassy" ..	6/5/18	9/3/23	Withdrn.	
410	E. A. Strauss, M.P., "Derry's Fairy"	16/5/16	22/1/23	51	0
490	Mrs. H. Briggs' "Lily of the Valley"	26/11/17	24/4/23	33	8
	*400, days in Milk—35				
	CLASS 135—GUERNSEY.				
*431	Mrs. R. C. Bainbridge's "Tregonning Lucky" ..	30/8/18	23/1/23	32	2
*433	A. C. Beatty's "Lily o' L'Aumone"	25/10/17	21/1/23	36	12
*441	Lieut.-Col. Hon. G. Lawrence, D.S.O. "Hawes Farm Gwendolen" ..	27/2/21	24/4/23	22	12
*495	A. C. Beatty's "Lizotte of St. Catherine" ..	20/6/18	2/4/23	56	4
	*431, days in Milk—114				
	*433, ,, ,, 116				
	*441, ,, ,, 23				
	*495, ,, ,, 45				

BUTTER TEST.

PARTICULARS OF COWS TESTED, YIELDS OF MILK AND BUTTER, AWARDS, ETC.

Butter Yield.	Ratio, viz., lbs. Milk to lbs. Butter.	Points for Butter.	Lactation.	Total Points.	Awards.	Butter Colour & Quality	
lbs. oz.						C.	Q.
1 4	21·3	20	Nil	20		Poor	Good
1 13½	23·4	29·5	1·5	31		Ex.	V.Good
1 10½	22·46	26.5	9·0	35·5	Bronze Medal	Good	V.Good
2 4	14·22	36·050	12·0	48·0	Gold Medal	V.Good	V.Good
					Cow ill.		
2 4¾	22·10	36·750	7·5	44·250	Silver Medal	Fair	V.Good
1 14¾	17·37	30·750	Nil	30·750		Fair	V.Good
1 12¾	18·4	28·750	7·4	36·150	Third Prize.		
1 15	19·3	31·00	7·6	38·600	Second Prize.		
1 3½	20·2	19·5	Nil	19·50			
2 7½	22·3	39·5	·5	40·00	First Prize.		

Pavilion" was passed through this filter. My thanks are due to Mr. Gibbs, Steward of the Working Dairy, and to Captain Clive and Mr. Read, for their valuable assistance and to the whole of the Staff, who spared neither time not trouble in making the work of their department a success.

The thanks of the Society are also due to the County Agricultural Committees of Glamorgan and Somerset for allowing the members of their Staffs to give us such valuable assistance ; to Mr. Davidson, the Director of Agriculture for the County of Glamorgan ; and Mr. F. J. Parker, Hon. Secretary of the Local Committee, and in conclusion I must add that the judging by Miss D. G. Saker, in the butter-making Competitions, gave entire satisfaction to all the competitors.

X.—THE FORESTRY SECTION AT SWANSEA.

By G. Lipscomb, Steward.

It is satisfactory that this report on the Forestry Section at Swansea can speak of a distinct advance in some directions, and though there were no entries for Boards—classes that since the War have for obvious reasons failed to fill—the general level of exhibits was distinctly high, and went to prove that in spite of the present somewhat discouraging outlook, there is faith in English Forestry and in the ultimate result, if the Industry is fairly treated by the State and provided reasonable care is taken to ensure economy and the observance of necessary Forestry Laws, and this applies especially to districts where the market is close to the plantation, and heavy transport and railway charges have not to be faced. The English grower of timber has still, however, a great deal to learn and it is with the object of placing facts clearly before the public and at the same time showing what can be done with English timber that the Bath and West have for many years included a Forestry Section in their Annual Show, and it is gratifying to be able to say that this Section has justified its existence. A keen interest was taken in the Swansea exhibit, a rough estimate of the visitors entering the building giving the large figure of 40,000.

Coming to the actual exhibits, the Forestry Commission sent under the charge of Mr. Poplet a large and well balanced exhibit, not for competition—the exhibit ranged over a wide field and starting with the Planting Scheme in its various forms, it gave the seed, the seedling, the growing tree, the various insect pests and fungi that trouble the Forester and are capable of doing so much damage

—and, finally the resulting timber and the uses to which it can be put. The attendance during the Show of a Representative from the Commission was of great advantage and considerably enhanced the educational value of the exhibit.

The excellent collection from Charborough Park again won the Society's Gold Medal—it has been extended and now presents a very complete and interesting and particularly well mounted exhibit collected and arranged with great care and knowledge—full description and explanation is affixed to each specimen and the information contained is most valuable. A good series of diagrams and some well mounted specimens of foliage render the exhibit more complete, and it only remains now to add items illustrating the purposes for which English timber is suitable, and showing the advantage of doing so, to render this exhibit fully representative. Mr. Munro, the Forester on Captain Drax's Estate, has taken great pains and is to be congratulated on the result. Sir Henry Hoare sent as usual a most interesting collection of some hundred varieties of conifer foliage. Mr. W. C. Llewellyn sent a varied exhibit of considerable interest, a useful feature being a chart showing the effect of noxious fumes on various trees. The results given in the case of the principle hard woods was on the whole satisfactory—of conifers, Corsican Pine gave the best results. The English Forestry Association concentrated their attention as far as possible on the practical uses of timber and the exhibit was an excellent one—such as one expects from the Association. The excellent results obtained by the use of Elm for street paving is put forward strongly and backed by actual specimens taken from a main thoroughfare after many years wear. A novel and most interesting feature staged by the Association was a model of a large plantation. The model was erected on a platform some 12 feet by 8 feet and was designed to show how a tract of hilly country should be laid out. The various altitudes were given, the points of the compass and the direction of the prevailing wind and actual plants were used in the appropriate positions, the sheltered valleys, the exposed slopes, the marshy fringes to the streams, and the level plateaux, all were planted in miniature—seedlings being employed—and as a result the model was not only a work of art, but extremely useful as a practical guide to anyone in search of information.

The Ashton Court Estate contributed as usual a most interesting and practical exhibit. Showing the excellent results that can be obtained on an Estate by the use of home grown timber for even the best carpenters work. The Great Western Railway sent an exhibit that showed how suitable home grown timber is for railway work and contributed sections of sleepers of English timber creosoted, taken from running lines.

I should like to conclude this short report by recording an incident that took place at the Swansea Show and that contains an obvious moral. A certain well-known and prominent agriculturist was anxious to obtain advice as to the best kind of timber to use for certain purposes in connection with cheese making, he visited the Forestry Section and the unanimous opinion of those qualified to judge was in favour of sycamore for the purpose indicated. Ultimately, however, he had to use other timber, less suitable, as he entirely failed to procure the necessary quantity of seasoned sycamore. There is plenty of good sycamore in the country and I hope if any timber merchants see these words, they will take note.

The Glamorgan County Council very kindly placed the services of their Horticultural expert at the disposal of the Society and the demonstrations given during the Show at stated intervals on growing fruit trees were very well attended.

Professor H. A. Pritchard again most kindly acted as judge of the Section.

XI.—AGRICULTURAL EDUCATION AND RESEARCH, NATURE STUDY AND HANDICRAFTS.

By H. M. Cundall, I.S.O., F.S.A.

The valuable assistance rendered to the Society by Agricultural Colleges and Institutions has gradually increased during recent years. It has greatly added to the educational value of the Show.

In order to avoid the incongruity of their scientific work being displayed alongside of Nature Study and Handicrafts from Elementary and other Schools, two separate buildings were provided at Swansea.

Agricultural Education and Research.

In this building the highly educational work created considerable interest amongst farmers and others connected with agricultural pursuits. The value of the exhibits was greatly enhanced by the professors and their assistants in attendance. They were engaged during the whole period of the Show in demonstrating the various points to interested persons and in discussing the problems involved.

The University College of Wales, Aberystwyth, had an exhibit provided jointly by the Agricultural Department of the College and the Welsh Plant Breeding Station.

Plans of the College Farm at Nantcellan and the Plant Breeding Station Farm at Frongoch, showing the various types of soil contributing to the farms were exhibited, together with samples showing the proportion of the mechanical constituents of the several soil types found on the farms.

The Plant Breeding Station exhibit was arranged with a view to demonstrating the fact that there is as great a variation between different strains of the same species of grasses and clovers as there is between the various varieties of cultivated oats. Panicles of a number of representative oats were exhibited with a view more particularly to demonstrating the lecture which Professor Stapledon had given on the Show Ground relative to oat varieties.

With regard to herbage plants, the exhibit consisted chiefly of various strains of cocksfoot, perennial rye grass, timothy, tall oat grass and red clover. The difference between the ordinary commercial strains of the grasses and strains derived from the seed of wild plants was a marked feature of the exhibit.

Adult plants of red clover and seedlings about 18 weeks old were staged to demonstrate the marked difference between the broad red strains and the late flowering red strains ; typical plants of the extra late Montgomery and Cornish marl clovers, together with late-flowering reds from the Cotswolds, the east of England, and America were shown in contrast with English and Welsh broad reds and reds from Chile and Italy.

A series of typical turfs were also displayed showing the manner in which swards develop if left unsown in contrast to the swards that are developed when simple mixtures including wild white clover are sown.

The University of Bristol (Zoology Section) gave special prominence to such internal parasites as effect domestic animals. Tapeworms and round worms were represented both by bottled specimens and microscopic slides. Keen interest was shown by visitors in the liver fluke. The contrast between the limbs of the horse and the cow on the one hand, and those of man on the other, was illustrated by actual bones ; representative types covering practically the whole animal kingdom were also shown.

The Botany Section exhibit consisted of the association of various plants, more particularly between green plants and fungi. A model of a forest showed the indirect association between the trees and fungi. In the autumn the ground is covered with leaves, dead branches and other débris, which are broken down into simpler compounds by the action of fungi and bacteria on them. The fungi absorb the nutrition they need and leave the nitrates for the trees, which is their only supply of nitrogen.

A series of drawings, specimens, and microscopical preparations represented how some fungi have a beneficial effect on the plants, and others a pernicious effect. The nodules on the roots of leguminous plants are caused by the *Bacterium radicicola*, which has the power of fixing nitrogen from the air in such a form that the plant can use.

Enlarged micro-photographs illustrated how the roots of orchids contain a fungus which also lives in the soil. Without this fungus the seeds cannot germinate.

Californian bees and lichens were shown as examples where two organisms live in perfect harmony. In the former case, a yeast and a bacterium live together, and each thrives on the by-products of the other. The latter consists of a fungus and a simple green plant.

Specimens illustrated when a fungus becomes aggressive the green plant becomes diseased. If the fungus is merely superficial (*e.g.*, Black Scurf Fungus of Potato), the disease is not serious. But if the fungus penetrates into and between the cells and forms a poison which kills the tissue of the host, the disease may be fatal.

Examples were also shown of intermediate forms, including most of the diseases of the potato, rust, smut, etc.

The Agricultural and Horticultural Research Station of the University at Long Ashton, exhibited specimens and photographs illustrating current investigations of the Station on: (*a*) various problems relating to willow culture, the preparation of rods for basket-making and other purposes, and the utilisation of bye-products of the willow industry ; (*b*) the manuring of fruit trees and the action of the individual essential food constituents on the growth and behaviour of the trees ; (*c*) diseases of fruit trees, particularly those of reversion of black currants and apple tree canker.

The Fruit and Vegetable Preserving Research Station at Campden, Gloucestershire, showed specimens of bottled fruits and vegetables, also jams, chutney and sauces.

The National Museum of Wales, Cardiff, sent botanical, zoological and geological specimens ; also an interesting collections of obsolete farm appliances.

The Glamorgan Agricultural Committee contributed an extensive collection dealing with subjects of interest to the farmer.

The University College, Swansea, sent from its Biological Department specimens showing the effects of fertilisers on plant growth, stages in germination of seeds, and growth of plants without soil. From the Geology Map Department rock specimens representing the geology of South Wales and examples of relief models and maps.

NATURE STUDY AND HANDICRAFTS.

This building was mainly filled with a representative collection of the work by students in the various grades of schools under the Swansea Education Committee. It admirably demonstrated how the instruction is carried out with a view to educating the young in the various branches of industry in the town of Swansea and its neighbourhood.

The Art Section was graded from the Infant into the Elementary, Central and Secondary Schools, leading up to the Art School and Technical College. The feature in the work of the children in the Infant and Elementary Schools was the development of skill in representing objects in still life in various mediums. In the Central and Secondary Schools greater use is made of the art of design, both in stencilling and tracing, and the practical use of studies from life in decoration. From the School of Art were shown designs for metal work, also such decorative work as graining and marbling. Good models from the Manual Centres were also exhibited. Geographical illustrations and records of historical events were supplied by drawings by students in various schools. In the Nature Study Section there were specimens from the sea shore, bird life, seed dispersion, pond life, etc., from the rural schools. Although there were a few birds' eggs, it was stated, special stress is laid on the children that there should be no wanton destruction, and that not more than one egg should be taken from any nest.

From the Metallurgical Department of the Technical College there were specimens based on the local industries; from the Engineering Department examples of threads and bolts and tests for the strength of metals; and from the Pharmaceutical Department chemicals in their natural state and drugs prepared for use.

The Merthyr Tydfil Education Committee contributed an exhibit showing the gradation of drawing, needlework and woodwork in the various schools under their control. St. Winefride's Convent School, Swansea, exhibited some good examples of needlework and drawings executed by the pupils.

Swansea and South Wales Institution for the Blind showed all kinds of basket work and knitting. Three blind workers attended the Show daily and gave practical illustration of the work done in the Institution. A blind man displayed great skill in making baskets, whilst two women were engaged in machine knitting, one working a round machine, and the other a flat one.

XII.—THE EXHIBITION OF CIDER AT SWANSEA.

By E. W. Farwell, Steward.

The entries at the Swansea Exhibition in 1923 numbered 56, as compared with 28 at Plymouth in 1922, and 35 at Bristol in 1921, and were the largest number since 1915.

The classes, as usual, were open to growers or makers, and were as follows :—

Class 225.—Cask of not less than 9 and not more than 30 gallons of Cider made in 1922, of a specific gravity not exceeding 1.015 at 60° Fahr.

Class 226.—12 Quart Bottles of Cider made in 1922, of a specific gravity not exceeding 1.015 at 60° Fahr.

Class 227.—Cask of not less than 9 and not more than 30 gallons of Cider made in 1922.

Class 228.—12 Quart Bottles of Cider made in 1922.

Class 229.—12 Quart Bottles of Cider made in any year previous to 1922.

Since the last exhibition, death has robbed the Society of the services of Mr. F. J. Lloyd, F.C.S., who has analysed every exhibit of cider on behalf of the Society for many years, and whose exderimental work in connection with cider has been of great benefit to the industry. In his place, the Society's Consulting Chemist, Dr. J. A. Voelcker, M.A., F.I.C., undertook the analysis, and particulars of the result are set out in the accompanying table. There was one absent entry and one entry was disqualified for exceeding the maximum specific gravity of 1·015 in the class for bottled cider.

Mr. W. Gaymer, of Attleborough, Norfolk, was the judge appointed by the Society, and he carried out his duties on the first day of the Show.

The ciders in the dry classes were very indifferent, with no character, and although they were clean and well handled, they appeared very deficient in quality, except for the entries of Messrs. Parry and Co., in the bottle class, which were a good, clean, but rather gassy cider.

In Class 227, the prizewinners were very even, but the quality of the cider was again only moderate.

In the next class, which was a large one, half the entries were easily eliminated, when the remainder became more even, and the Judge experienced some difficulty in placing them in their respective order.

1923.

Class.	*No.*	*Specific Gravity.*	*Solids.*	*Percentage of Alcohol.*	*Acid.*
225	1	1·003	2·72	5·18	·38
	2	1·014	4·87	4·01	·31
	3	1·013	5·00	4·30	·35
	4	1·014	4·77	3·65	·59
	5	1·015	5·32	3·86	·34
	6	1·011	4·60	4·88	·31
	7	1·007	3·80	5·33	·25
	8	1·015	5·40	4·86	·65
226	9	1·003	2·80	5·63	·50
	10	1·014	5·02	4·18	·30
	11	1·014	5·15	4·01	·27
	12	1·015	5·12	2·94	·28
	13	1·011	3·58	2·46	·20
	14	1·010	3·82	3·43	·53
	15	1·014	5·15	3·33	·51
	16	1·015	5·32	3·72	·35
	17	1·010	4·30	5·03	·34
	18	1·007	4·00	6·08	·32
	19	1·014	5·15	4·30	·55
	20	1·014	5·12	4·44	·39
	21	1·031	8·40	1·64	·28
227	22	1·026	7·57	3·08	·35
	23	1·025	7·45	3·15	·26
	24	1·004	2·80	5·18	·57
	25	1·020	5·40	1·00	·13
	26	1·022	6·48	2·52	·70
	27	1·026	7·47	2·73	·41
	28	1·026	7·60	3·01	·36
	29	1·028	8·39	3·72	·32
	30	1·022	6·97	3·93	·56
228	32	1·024	7·13	1·57	·34
	33	1·024	7·22	3·15	·25
	34	1·026	7·52	3·01	·28
	35	1·003	2·80	5·33	·26
	36	1·020	5·35	0·85	·22
	37	1·022	6·47	2·32	·46
	38	1·018	5·17	1·64	·39
	39	1·028	7·87	2·46	·30
	40	1·027	7·70	3·01	·40
	41	1·029	8·10	2·46	·37
	42	1·016	5·30	3·86	·42
	43	1·021	5·92	1·64	·21
	44	1·023	7·05	3·58	·53
	45	1·020	6·10	3·01	·30
	47	1·034	9·10	1·70	·36
229	48	1·020	6·70	4·44	·38
	49	1·038	10·56	2·32	·25
	50	1·026	7·52	2·59	·31
	51	1·012	4·40	3·30	·30
	52	1·010	4·78	4·74	·21
	53	1·012	4·85	5·02	·56
	54	1·031	9·05	3·58	·36
	55	1·022	7·50	5·33	·24
	56	1·030	8·60	3·01	·21

In the class for old cider, the first prize went to a dry cider, which was easily the best, and the rest had no outstanding character at all.

The following are the Judge's comments on the exhibits :—

"With respect to the cider exhibits, it struck me at the time that the majority came from a district showing almost the same characteristics, viz., sweetness without flavour, and this ran through nearly all the samples. As such, they would not appeal to the present day taste nor attract any special attention.

"Shortly, with one exception, they were of a very second rate standard of excellence, certainly not equal to what have been shown in the past. But to be perfectly fair, I must say the two samples, Nos. 14 and 15, in Class 226, were really good, fine ciders, and I decided that although separately entered, they were one and the same.

"I was greatly disappointed with the over-yeared samples, very few of which were worthy of a commendation at all; the more surprising when taking into account their year of production, viz., 1921."

XIII.—ANNUAL REPORT UPON THE SOCIETY'S GENERAL OPERATIONS.

By F. H. Storr.

The Annual General Meeting of Members was held on Saturday, May 19th, in the Council Pavilion in the Show Yard at Swansea.

The Deputy President, Lord Blythswood, was in the Chair, and among other Members present were, The Marquis of Bath, K.G., Lord Bledisloe, K.B.E., and Mr. H. B. Napier (Vice-Presidents), The Rt. Hon. Sir R. A. Sanders, Bart, M.P., Sir F. H. Bathurst, Bart., D.S.O., Sir C. Miles, Bart., the Rev. Preb. F. F. Buckingham, Col. F. D. W. Drummond, Col. E. Lewis, Major E. W. Farwell, Capt. W. Best, Capt. E. A. B. Clive, Prof. J. Penberthy, Messrs. H. E. Bastard, J. Campbell, F. W. A. Daniels, J. E. Daw, E. G. Dulcken, J. T. Gibson, G. Gifford, W. L. Hosking, A. L. Hobhouse, H. J. Kingwell, S. J. Knight, G. Lipscomb, C. M.-F. Luttrell, J. Marshall, W. H. Neal, F. J. Parker, A. A. Partridge, E. Morton Peel, H. L. Pritchard, G. N. Rawlence, J. F. Shelley, J. I. Storrar, A. O. Thomas, T. H. Tilley, C. D. Thompson, C. C. Tudway, C. C. Vivian, W. J. Warren, E. White, W. Williams, &c.

The Minutes of the last Annual General Meeting having been read and confirmed, on the motion of the Marquis of Bath, seconded by Mr. S. J. Knight, it was unanimously resolved that Lt.-Col. Sir Dennis F. Boles, Bart., C.B.E., D.L., be elected President of the Society for the ensuing year.

On the motion of Mr. J. E. Daw, seconded by Sir F. H. Bathurst, it was resolved that the Rt. Hon. The Lord Blythswood and Mr. W. Ashcroft be elected Vice-Presidents of the Society, and the gentlemen named on p. ciii of the appendix were elected Members of Council for the years 1923-1925 on the motion of Mr. E. G. Dulcken, seconded by Col. E. Lewis.

Sir R. A. Sanders in moving the adoption of the following report which had been passed by the Council Meeting on the previous day, said that it represented a record of successes, except on some occasions when the Ministry of Agriculture had been approached. The Society in fact, showed signs of getting younger in spirit as it got older in years. Lord Bledisloe in seconding, referred to the honours done to the Society by the visit to the heir of the throne, who had shown great interest in, and sympathy with, all the activities of the Show Yard. The Society were able to welcome the Minister of Agriculture as one of themselves, and to show him what efforts it was making for a poor and depressed industry. The report emphasized the educational side of the Society's work in which it had always been a pioneer. The report was approved and ordered to be printed in the Society's Journal.

"It is with great pleasure that the Council are able to open their Annual Report by recording the visit to the Show paid by the Society's President, H.R.H. The Prince of Wales, K.G. The interest he takes in Agriculture is well-known, and efforts on its behalf are among the most important of his manifold activities, while the Society may fairly regard his acceptance of the Presidency in 1922 and 1923 as a proof of the importance he attaches to the work of the oldest of the great Agricultural Societies of the Empire. It is particularly appropriate that H.R.H. should have visited the show while that event took place in his own Principality of Wales, and at Swansea where the Society is always sure of so warm a welcome.

"The Council take this opportunity of expressing to the City of Swansea their warm appreciation of this cordial welcome, and their indebtedness to the local Committee, and to all those who have, like the President, contributed to the prize list, and to the success of the Show in other ways. In this connection special mention must be made of the Swansea Horse Show Society, who have given up their own Annual Meeting for the year, and whose members have been active in giving assistance where it was needed. Your Council have placed this Society on the footing of a County Society, thus securing to its members full privileges with respect to Show admissions and entry fees.

"The Society are particularly indebted to Mr. F. J. Parker, the Hon. Local Secretary, who has the unique distinction of having acted in that capacity on three successive occasions. The Society has no more loyal supporter, and in recognition of his connection of more than 20 years with the Society your Council have unanimously elected him as a Life Governor.

"The present Show compares favourably with those previously held in Swansea, and the Society is always glad to renew the close association it has long enjoyed with this important industrial centre. A special feature this year will be the exhibits from the centres of advanced Agricultural Education. Aberystwyth, Swansea and Cardiff are all participating, while Bristol University and the Long Ashton Institute are continuing the really excellent series of exhibits which attracted so much attention in the two previous years. The National Institute for Research in Dairying are managing the most comprehensive demonstrations which has ever been given at a British Show on the methods and advantages of the production of Clean Milk. This has been rendered possible by the help of a strong local committee under the Chairmanship of the Mayor of Swansea, with the co-operation of the Glamorgan Agricultural and Health Authorities. That the programme of Show Yard addresses is a strong one, is sufficiently vouched for by the names of the lecturers, Dr. C. Crowther, of Harper-Adams College, and Prof. R. Stapledon and Mr. Griffiths, of Aberystwyth.

"Your Council have, wherever possible, used its influence in forwarding measures likely to be of value to landowners and farmers. The high cost of rail transport is undoubtedly one of the chief factors of the existing agricultural depression. It was considered that the most effective action that could be taken in this matter was to support the Joint Committee of British Live Stock Breeders, who already represented a large body of agriculturists, and who employed counsel to safeguard their interests before the Railway Commission. It was therefore decided to make a grant towards the expenses incurred by the Committee, this grant to be proportional to the membership of the Society in comparison with the membership of other bodies co-operating. The action of this Committee has, without doubt, had a large share in determining the railway companies to grant a larger remission of charges to agricultural implements and produce than to other forms of merchandise.

"Another matter which has been constantly brought to the attention of the Council has been the unfair burden of the Entertainments

Duty upon Agricultural Shows. Though this duty bears more hardly upon small shows than upon the larger agricultural Societies, it was felt that it constituted an injustice to Agricultural Shows in general, and so was a real handicap on the fulfilment of their special functions, the improvement of British Live Stock and the advancement of the science of Agriculture. It may not be out of place here to mention that the necessity of obtaining exemption from this duty, prevented the exhibition of educational films, illustrating the study of natural history at the Society's Show. Strong representations were therefore sent to the Minister of Agriculture and the Chancellor of the Exchequer, urging that the tax should not be enforced in the case of Agricultural Shows, even when music and other attractions are included in the programme, It remains to be seen if these and similar representations from other bodies will lead to a remission of the duty. The Society also warmly welcomes the removal (on the initiation of two of its members) of the whole of the excise duty on cider, as calculated to afford a much needed stimulus to cider-making on farms in the West of England and Wales.

"Your Council have recently had the revision of the General Laws and Bye-Laws before them, and a copy of these as amended will be included in the next issue of the Society's Annual Journal. While in no case have the general principles governing the conduct of the Society been altered, a number of sections existed in which the laws had become either antiquated or inconsistent with each other. It is satisfactory to report that the membership of the Society again shows an increase. There is no better means of insuring a widespread interest in the work of the Society and of promoting the interests of agriculture in the wide district covered by its activities than by securing new recruits, and it is hoped that all members will personally help to do so. The satisfactory result of the Plymouth and Bristol meetings has enabled your Council to invest a sum of £2,000, while they are glad to report a further appreciation in the value of the Society's invested capital.

"The Society have to deplore an unusually heavy loss of valued Members. The late Earl of Plymouth and Mr. A. O. Sillifant were both Vice-Presidents and firm supporters of the Society; Major Jestyn Williams, Mr. W. H. Clark and Mr. W. G. Busk were members of the Council who had worked hard in the interests of the Society, Mr. Clark being for many years a Dairy Steward, while Mr. Busk's influence in Dorset was steadily employed to increase the Society's Membership. The Council also regret to have to report that ill-health has compelled Colonel U. E. P. Parry Okeden to sever his connection with the Council of which he has been a Member for more than 20 years. It is, however, gratifying to note that in Lord Folkestone and Mr. A. L. Hobhouse, as Members of Council, and Mrs. Busk and the Earl of Plymouth as Members of the Society, some old and valued family connections are preserved. Extraordinary vacancies on the Council during the year have also been filled by the election of Capt. E. A. B. Clive, Lord Swansea and Major A. D. Pass.

"During the year the Council have again made a grant of £100 to the Bristol University Agricultural Research Station and nominated Mr. H. B. Napier as their representative on its governing body. The Research Station not only sends one of the most valuable exhibits to the Annual Shows, but gives great assistance to the Society in the conduct of its experimental work, namely, the demonstration of the Improvement of Poor Pastures. This work is being continued, and shows good results, but it will be necessary to wait another year before reliable results can be obtained. A progress report of last year's work is published in the current number of the Journal. The Society's representatives on the governing bodies of the Dauntsey School Foundation, the Agricultural Education Committee of Wiltshire, the Wye College and the Sugar Beet Growers' Society remain the same, while Members will be pleased to hear that Prof. J. Penberthy, F.R.C.V.S., has been nominated to represent the Society at the R.A.C., Cirencester.

"The Council recommend that Mr. W. Ashcroft be elected a Vice-President of the Society, in view of his long services as Steward of stock and experiments, in which latter position his assistance was of especial value. They also recommend that the gentlemen named on the agenda paper be elected as Members of Council for the years 1923-1925.

"Your Council desire to tender to the Rt. Hon. The Lord Blythswood their thanks for his services as Deputy-President of the Society for the past year, and recommend that he be elected a Vice-President of the Society. It is with great pleasure that they are able to report that Lieut.-Col. Sir Dennis F. Boles, Bart., C.B.E., D.L., has consented to be nominated as President for the ensuing year, and they unanimously recommend his election, which will be a popular one at Taunton, where the 1924 meeting will be held."

Mr. J. F. Shelley, by permission of the Chairman, then raised the question of the inadequacy of the arrangements made by the Railway Company for the delivery of the Stock in the Show Yard. No reliefs had been provided for the railway staff in the

Show Yard who had been on duty in some cases for 18 hours. The supply of floats was insufficient and some of the horses employed were incapable of drawing their loads. Capt. W. Best detailed the efforts which been made by the Stewards to remedy this state of affairs, and reported that the Railway Company concerned had tendered an apology and made full provision for the outward traffic.

A proof of the Society's General Laws and Bye-Laws with the amendments recommended by Council was submitted to the Meeting, and on the motion of Mr. G. Lipscomb, seconded by Mr. J. F. Shelley, the Laws as revised were adopted.

Votes of thanks were passed to the Mayor of Swansea, Mr. F. F. Mason, and the Local Committee, for their help in ensuring the success of the Meeting. Mr. F. J. Parker, in reply, thanked the Society for the honour done to him in electing him a Life Governor of the Society. Votes of thanks were also passed to the Judges who had officiated, and to Lord Blythswood, who as Deputy-President had rendered great service to the Society.

XIV.—THE NATIONAL FRUIT AND CIDER INSTITUTE.

By B. T. P. Barker, M.A., Director.

In reviewing the work of the Institute during 1923. while there is considerable development in various directions to be recorded, the year has been noteworthy mainly as the first since the outbreak of the war to permit of the conduct of the work under relatively settled and stable conditions. The approximate amount of the grant available from the Ministry of Agriculture for the maintenance of the Station until 1927 has been provisionally decided and the programme of work correspondingly determined. Under these conditions steady all-round progress has been made. The younger fruit plantations established since 1918 are approaching the result-producing stage, definite headway is being made with investigations which have been in hand for some time, the work of the Station is becoming much more widely known, the number of visitors increases each year, and the applications received for advice and assistance have advanced in number in a striking degree.

During the year the greater part of the extensions referred to in the last Annual Report as provided for by a capital grant of £5,000 from the Ministry of Agriculture have been completed. These are recorded in the following paragraphs, which also deal with other matters of general interest which have occurred during the period under review.

Staff.—The vacancy in the post of Research Mycologist, referred to in last year's Report as resulting from Mr. S. P. Wiltshire's resignation to join the staff of the Imperial Bureau of Mycology, has been filled by the appointment of Mr. H. R. Briton-Jones, B.Sc., late Mycologist to the Egyptian Ministry of Agriculture. Mr. Briton-Jones started work at Long Ashton in March last. In addition to the researches in various diseases of fruit which he has begun and to some of which reference is made below, he has given considerable time to the advisory work in fungoid diseases of the agricultural and horticultural crops which has arisen in the Bristol Province during the year. It is expected that he will be able to devote the whole of his time to research in future, since the impending appointment of an Adviser for Mycology, for which sanction has now been received, will relieve him of any normal advisory work.

The transfer of Mr. A. H. Lees from the Advisory Staff to the Research Staff as Research Entomologist, mentioned in the last Report as having been arranged, has now taken place. Mr. E. Ballard, B.A., late Entomologist to the Madras Government, has succeeded him as Adviser in Economic Entomology, having taken up his duties in January last.

The resignation of Mr. F. Summers was received on his appointment as Head of the Botanical Department of the Shirley Research Association on Cotton. His departure at the end of September left the post of Plant Physiologist vacant. Future arrangements with regard to this post are at present under consideration. Pending their settlement it will be left open.

Mr. S. S. Light, B.Sc., has during the year been engaged at Long Ashton on an investigation on the mosses, lichens and algae found on the bark of fruit trees, their removal with winter washes, and the effect of the latter upon hibernating insects and fungus spores. The cost of this work was met by a special grant awarded to him by the Ministry of Agriculture and Fisheries, which lapsed at the end of September.

Miss Gilchrist, B.Sc., Lecturer in the Botanical Department of the University of Bristol, who has as previously reported, been investigating the Myxosporium disease of apple trees, is now taking a year's course of study in the United States. It is hoped that she will be able to resume this research on her return next summer.

Miss Ridler, of the same Department, is continuing in conjunction with Mr. Lees her research on the comparative anatomy of healthy and reverted Black Currant plants.

In connection with the survey of soils in the fruit-growing district of East Anglia and the West of England, begun by this Station last year in collaboration with the Cambridge University School of Agriculture, Mr. A. W. Ling, N.D.A., has been appointed research assistant to Mr. Wallace, who is undertaking the Long Ashton section of the work.

Mr. J. F. Ward, B.A., after completing his horticultural course at Cambridge University, is now engaged upon an investigation at Long Ashton on the character and development of the root systems of red and black currants.

Land and Plantations.—Reference was made in last year's Report to the preparations in hand for the establishment of additional fruit plantations for experimental work. Of the thirty acres of land taken over from Fenswood Farm since the beginning of 1921 approximately one-third was arable and the remainder pasture, the two fields of which that area is comprised adjoining and being separated from each other and the adjacent Paradise plot of cider bush trees by hedges. The latter have been grubbed, making one contiunous stretch of land about thirty acres in extent. Shelter belts of trees are being planted on the south-western and north-western boundaries with additional windbreaks running north and south across the land, dividing it into three sections of almost equal breadth. The pipe drainage of the whole area has been completed and the portion formerly under grass has been ploughed and prepared for preliminary cropping with agricultural crops before being planted with fruit. The remainder has now been planted, mainly with bush apples, with the exception of a section to be devoted to manurial experiments on strawberries, the plants required for which will be ready during the spring of 1924. The apple plots will be used chiefly for pruning and spraying experiments. Soft fruits—currants and raspberries—have been interplanted among the apples. An acre plot of loganberries has been also planted in the adjacent Paradise plot. A strip of grass land, about four acres in extent, on the south side of the railway, lying between it and the plantations established on the termination of the war, has been broken up and is now in preparation for fruit.

In the field mentioned in last year's Report as appropriated for the Willow trials, a plot of one acre has been prepared and planted with 80 varieties of willows for trial purposes. Allowing for the unfavourable character of the early summer, following so soon after planting, the willows generally have grown well and indicate that the land will be suitable for the work contemplated.

The development of the area on the south side of the railway—some 80 acres in all—has necessitated the erection of new farm buildings, (see next Section) and the construction of a roadway half a mile in length to serve the new plantations. This work has been completed during the year. The land in question is crossed by two rights-of-way, diversion of the course of which was desirable to avoid awkward intersection of the experimental plots. The sanction of the Long Ashton Parish Council to the diversions having been secured, new paths have been made and fenced.

Buildings.—The considerable recent extensions of the fruit plantations have rendered the provision of additional farm buildings necessary. The new buildings which have been erected during the year include stabling, a packing shed and stores, an office for the fruit foreman, a mess-room and watchman's quarters. They are situated in a central position on the land which has been developed on the south side of the railway and, being adjacent to one of the railway bridges, are also in close touch with the older plantations on the opposite side of the line. A yard surrounding these buildings is being enclosed and metalled.

The increasing amount of experimental work which requires pot culture treatment has outgrown the capacity of the accommodation under glass hitherto available. During the year the latter has been extended by the erection of an orchard house for physiological experiments and an addition to the old lean-to greenhouse.

Plans for an insectory, a shelter for outdoor pot experiments, and an addition to the original orchard house have been prepared.

The recent and impending Staff increases have made a re-arrangement of laboratory accommodation essential. It has involved the division of the large room into two smaller laboratories and the conversion of a portion of the shedding adjoining the greenhouses into small laboratories for plant physiological work and the willow research. The loss of the large room in the laboratory building by the division just referred to has left the Station without accommodation for meetings and lectures, while the available shelf room in the library has now become inadequate for the annually increasing stock of literature. It is hoped that sufficient funds will be available to permit of the extension of the library to serve both requirements; plans for this are now under consideration

During the summer the cider house has been enlarged by the addition of a one-storey building about 55 feet square. It adjoins the existing press-room, which has been thrown into it, and has been constructed to permit of more extensive storage for cider fruit under cover, the removal of the mill from the old mill-room to a position adjoining the press and the provision of washing facilities for fruit prior to milling. The equipment of the cider house has also in other respects been improved and brought more up-to-date.

General.—The survey of soils in certain of the fruit-growing districts of East Anglia and the West of England referred to in the last Annual Report as having been commenced with the aid of a special grant from the Ministry of Agriculture and Fisheries has proceeded actively during the year. A corresponding grant for this work for the coming year has been made by the Ministry.

Educational exhibits illustrating the research work of the Station have been sent during the year to the Imperial Fruit Show and the Bath and West Show.

Two field days have been held at Long Ashton during 1923. The first, on May 10th, was the Annual Tasting Day, when, as usual, a demonstration of the results of the current season's experiments on cider making was the chief feature. The second, on September 26th, was designed primarily to give fruit growers an opportunity of inspecting the experimental work on fruit culture in progress at the Station. Demonstrations of some of the most recent types of spraying machines and cultivators, the grading of apples by the Cutler grader, apple packing and tree stump blasting were included in the programme. On both occasions very large attendances were recorded, that on the latter day being the largest in the history of the Station.

Apart from these functions there were, as usual, several occasions during the year when the Station was visited by parties organised by various horticultural bodies. Included among the latter was the Horticultural Trades Association, the annual meetings of which were held in 1923 at Bristol.

The continued increase in the number of individual visitors throughout the year is intensifying the difficulty of providing facilities for inspection of the work of the Station and consultations with the Staff without undue disturbance of the course of rescearh. The past year has furnished many occasions upon which attention to visitors has meant loss of valuable time and opportunity for investigations in progress.

An important change in the constitution of the Agricultural Research Committee of the University of Bristol, which is the body responsible for the administration of the Station, has to be recorded. Hitherto it has been composed of seventeen members, five of whom are nominated by the Council of the University, four by the Senate of the University, seven by the National Fruit and Cider Institute, and one by the Ministry of Agriculture and Fisheries.

The number has now been increased to 20 to permit of the direct appointment of one member by each of the County Councils of Gloucestershire, Somerset and Wiltshire. It is regarded as important that these counties, which contribute grants from the rates to the University, should be closely associated with the latter in its activities in agricultural research and education as well as in general education. The change in constitution inevitably involves an extension of policy with regard to agricultural matters and for that reason it has been decided to change the name to that of the Agricultural Committee of the University. One of the first results of the change has been the decision to appoint an Agricultural Information Officer, whose duties will in many respects supplement those of the Advisory Officers for the Bristol Province now attached to the Long Ashton staff. The appointment of Dr. J. A. Hanley, A.R.C.S., Ph.D., of the Agricultural Department of the University of Leeds, to this post has recently been made.

A Fruit Experimental Station, designed to serve more particularly the strawberry growing industry in Hampshire, has recently been established at Botley, Hampshire, by the Hampshire County Council and the fruit growers of that county with the aid of the Ministry of Agriculture and Fisheries. The Ministry desiring to ensure co-ordination between the work of the new Station and Long Ashton, the latter is being represented on the Governing Body and members of its Staff are collaborating with the Botley Staff in drafting the schemes of experiments to be undertaken and arranging joint trials at the two Stations.

Before proceeding to the Research and Advisory sections of this Report it is desired to refer to and acknowledge the important part taken by the administrative and assistant Staffs in securing the efficiency of the work of the Station.

The remainder of this Report, apart from the section on Advisory Work, consists of contributions by individual members of the Staff on various subjects which have been under investigation, the name of the contributor appearing in brackets at the head of each section. According to the arrangement as to the character of these Annual Reports indicated a year ago, many of these articles have appeared during the year, mostly in a more detailed form, in various technical journals. In each case the name of the Journal is stated in a footnote, but a general acknowledgment of the sources may be appropriately made here.

ADVISORY WORK.

The progressive increase in the advisory work of the Station, which had been conspicuous each year since the termination of the

War, showed no sign of slackening during the year ended September 30th, 1923. In fact not only was the total number of enquiries received through the post (658), the highest yet reached, but the advance on the previous year's figures (180) was also greater than on any former occasion. The statistics for the past five years are given in the following table, which shows also the numbers received from each of the counties included in the Bristol Province :—

	Year ending Sept. 30th,				
	1919	1920	1921	1922	1923
Gloucester (including Bristol)	29	53	73	78	136
Hereford	6	10	22	21	62
Somerset	75	79	96	114	141
Wiltshire	6	3	10	18	66
Worcester	11	29	45	46	48
Other Areas	75	117	125	201	205
	202	291	371	478	658

Included in the figures under "other areas" are the enquiries received from Devon and Monmouth, both of which counties contribute annual grants to the Institute although not forming a part of the Bristol Province.

The figures given have reference only to enquiries by correspondence and do not include those for the willow work, the latter being separately stated in the section dealing with that work. This being the first year of that work, the inclusion of the figures in the above Table would be misleading for comparative purposes. A large proportion of advisory work is unrecorded by them, since no details are kept of the numbers dealt with verbally. Matters raised by visitors to the Station or by farmers and growers visited by members of the Staff during the course of tours in the Province come under this head. In this direction also the extension of the work is very marked. In particular, the number of visitors to the Station has increased so much as to hamper seriously the progress of the Research work, every member of the Research Staff being more or less affected.

As regards the subjects of enquiry, under all heads there is an increase, this being most striking in Agricultural Chemistry, in which the cases dealt with have nearly doubled in number as compared with the previous year. The mycological enquiries also increased by more than 50 per cent.; since these had to be dealt with by the Research Mycologist of the Station, relatively little attention could be given by him to research proper. This difficulty should be obviated in future by the appointment of an Adviser in in Mycology, which will shortly be made. The advisory work on cider and related subjects has continued to increase steadily and both in amount and character reflects the marked development of interest in cider as a beverage which has been observed outside as well as in the West of England during recent years. Economic Entomology and Pomology are subjects which, so far as figures show, have not advanced much, but such a conclusion would be erroneous, particularly in the latter case, since much has been done other than by correspondence. On the other hand the comments made by the Adviser in Economic Entomology in his report appended as to the relatively small extent to which farmers and growers avail themselves of the facilities for help which the Advisory Scheme gives them are fully justified. There is evidence indicating that this is largely due to ignorance of the scheme and that as it is becoming more widely known the enquiries are correspondingly increasing.

The enquiries relating to willows and to fruit and vegetable preservation are not included in the above statistics. A separate report on the former work is appended, while the latter are dealt with in the report of the Campden Station.

NATURE OF ENQUIRIES.

Fruit Products.—The total number of enquiries answered were 212, of which many involved a complete analysis of samples and considerable experimental work. The sources of the enquiries were as follows :—

Gloucester	52
Hereford	7
Somerset	34
Wiltshire	0
Worcester	12
Other Areas	107

The work entailed visits to several cider orchards and factories. It was mainly concerned with questions arising in connection with cider and perry manufacture and the use of various kinds of apples and pears for the purpose. Considerable attention is obviously being given now by growers of table apples to the possibility of utilising lower grade fruit for cider-making.

As last year, several enquiries were received from abroad, the countries concerned being Antigua, Canada, New Zealand, South Africa, Belgium, France and Roumania.

Mycological.—The number of enquiries which have been received from the different counties during the last year are as follows :—

Gloucester	16
Hereford	22
Somerset	24
Wiltshire	7
Worcester	12
Other areas	30
Total	111

Under this heading come fungous, bacterial, and physiological diseases. The range of host plants is wide and includes fruit trees of many kinds, vegetables, and ornamental plants as well as agricultural crops.

In the spring of this year *Botrytis cinerea* was found doing very severe damage to wallflowers in the western counties. The two-year-old plants were more badly affected than the one-year-old. The reason for this is probably due to the greater density of growth in the older plants, which would retain moisture for a longer period and reduce the free passage of air within the flower beds. The fungus generally attacked the tips of the younger and inner shoots first and killed them back to the base. The fungus then spread through the crown and worked upwards inside the tissues of the outer and older shoots. In this way the whole plant was killed. Observations of the disease in different localities led to the conclusion that excessive nitrogenous manuring, bad drainage, and moist sheltered positions favoured the disease.

Several enquiries have been received concerning the diseases of plum trees. These include Silver Leaf (*Stereum purpureum*) Brown Rot and Wither Tip (*Monilia cinerea*), and the dying-off of plum trees which are five to eight years old. The latter disease has caused considerable loss in the Evesham district. So far the cause of this disease, to which the name of " Die-back " has been given, is obscure. Both *Diaporthe perniciosa* and *Cytospora sp.* have been described as causing this disease of young plum trees. Furthermore, it has been suggested that it is due to bacteria. So far infection experiments in this country with the fungi mentioned have failed to reproduce the symptoms of the disease in plum as it occurs in the field. Examination of plants from different localities show beyond doubt that the casual factor or factors, which bring about the death of the trees, are to a large extent in influenced by weather conditions, particularly in late summer and autumn.

This being so, it is evident that the factor of stock influence must be taken into serious consideration. Accordingly in the investigation into the cause of this serious disease of young plum trees which is now in hand an extensive trial of different scions on different root stocks is being made with a view of ascertaining the degrees of susceptibility.

The following table indicates the nature of the majority of the enquiries and associated fungi which have been received during the year :—

HOST PLANT.	NATURE OF TROUBLE.
APPLE	Water Core (physiological).
	Leaf Scorch (physiological).
	Myxosporium Canker (*Myxosporium corticolum*).
	Scab (*Venturia inaequalis*).
	Canker (*Nectria galligena*).
	Crown Gall (*Bacillus tumefaciens*).
ASTERS	Wilt (*Cephalosporium sp.*).
	Mildew (*Oidiopsis sp.*).
BARLEY	Late Blight (*Helminthosporium teres*).
CELERY	Hollow Stick (physiological).
	Leaf Spot.
BEANS	Chocolate Spot (*Bacillus Lathyri*).
BLACK CURRANT	Rust (*Cronartium ribicola*).
	American Mildew (*Sphaerotheca mors-uvae*)
	Corticium solani.
CHERRY	Blossom Wilt (*Monilia cinerea*).
GOOSEBERRY	American Gooseberry Mildew (*Sphaerotheca mors-uvae*).
GRAPE	Mildew (*Uncinula necator*).
OATS	Mildew (*Erysiphe graminia*).
	Leaf Spot (*Helminthosporium avenae*).
PLUM	Die-back (cause unknown).
	Silver Leaf (*Stereum purpureum*).
	Witches Broom (*Exoascus insititiae*).
	Brown Rot (*Monilia cinerea*).
	Fomes igniarius.
POTATO	The Common or Brown Scab (*Actinomyces scabies*).
PEACH	Silver Leaf (*Stereum purpureum*).
	Mildew (*Sphaerotheca pannosa var. persicae*).
	Leaf Curl (*Exoascus deformans*).
	Brown Rot (*Monilia cinerea*).
PEAR	Leaf Blister (*Taphrina bullata*).
	Scab (*Venturia pirina*).
	Eye Rot.
TOMATO	Stripe Disease (*Bacillus Lathyri*).
	Botrytis Rot (*Botrytis cinerea*).
	Sleepy Disease (*Verticillium albo-atrum*).
TURNIP	White Rust (*Cystopus candidus*).
WALLFLOWER	Botrytis Rot (*Botrytis cinerea*).
WHEAT	Bunt (*Tilletia tritici*).
	Whiteheads (*Ophiobolus graminis*).

Pomological.—The sources of the written enquiries under this head were as follows :—

Gloucester (including Bristol)	14
Hereford	2
Somerset	17
Wiltshire	1
Worcester	7
Other areas	39
	80

The figures give an inadequate idea of the large volume of advisory work which the Station is now doing under this head in the Bristol Province, most of which is dealt with by personal interviews with growers who visit the Station or are seen on their own farms. The subjects arising are much the same from year to year. During that under review no point of outstanding interest has arisen. Strawberry growing enquiries have once more been proportionately numerous, especially those in which the " red plant " problem has been concerned, to which further reference is made in the entomological section of the Report.

Shows.—Exhibits illustrative of the research work in progress at the Station have been sent during the year to the Imperial Fruit Show at the Crystal Palace and the Bath and West Show at Swansea. These were attended by members of the Staff of the Station.

In addition, assistance was given to the exhibits of the respective County Agricultural Education Departments at the various County Shows in the Bristol Province by the loan of material.

The following three sections, dealing with Agricultural Chemistry, Economic Entomology, and Willow Culture, have been respectively contributed by Mr. T. Wallace, Mr. E. Ballard and Mr. H. P. Hutchinson, the Advisors in those subjects.

AGRICULTURAL CHEMISTRY.

The number of requests for advice received during the year was 148. The sources and nature of these enquiries, together with their special points of interest, are given below.

SOURCES OF ENQUIRIES.

Gloucester (including Bristol)	32
Hereford	17
Somerset	37
Wiltshire	53
Worcester	6
Other Areas	3
Total	148.

NATURE OF ENQUIRIES.

(1) *Soil Problems.*

(a) *Soil Manurial Problems.*

Pastures and Meadows.	26
Arable Soils	104
Fruit Soils	9
Garden Soils	2
Hopyard Soils	1
Market Garden Soils	3
Total	145

(b) *Miscellaneous Soil Problems.*

Soil conditions causing chlorosis of fruit trees .	4
Soil conditions in cases of leaf scorch ..	7
Soil conditions in cases of crop failures . .	8
Suitability of soils for fruit growing .. .	5
Total	24

(2) *Miscellaneous Enquiries.*

Agricultural value of samples of lime, limestone and chalk	18
Potash content of samples of wood ashes	2
Purchase of manures	3
Manurial value of samples of sewage sludge	2
Manurial value of samples of shoddy	2
Manurial value of samples of paper mill waste ..	1
Comparative manurial value of samples of low and high grade basic slags	1
Manurial value of residue from spent mushroom beds	1
Fineness of grinding of sample of mineral phosphates	1
Cause of " cheese tainting " from pastures	1
Treatment of stock on " teart " land	1
Eradication of saffron from meadows..	2
Cause of failure to germinate of a sample of wheat ..	1
Treatment of " green patch " of tomatoes	1
Composition of sample of sulphate of copper	1
Analyses of feeding stuffs in cases of poisoning of stock	2
Value of cocoa factory refuse as pig feed	1
Feeding values of samples of mangels	1
Total	42

Number of Samples examined in dealing with Enquiries.

Soils	217
Samples of lime, limestone and chalk	18
Miscellaneous samples	10
Total	245

***Number of farms visited in carrying out advisory work*—** 28

OBSERVATIONS ON ENQUIRIES.

The number of enquiries submitted during the year shows a large increase over those of previous years.

A large proportion of the samples submitted from Wiltshire consisted of samples of soils suspected of being deficient in lime and of samples of lime materials. These samples were collected by the County Organiser from students attending his lectures in certain districts of the county where soil acidity is prevalent—generally on soils derived from the Lower Greensand formation. In the course of these lectures the Organiser emphasised the great need for lime in the local soils and arranged for the collection of any samples of soils and " lime " on which information was desired.

(1) *Soil Enquiries.*

On the whole the enquiries have been of a similar nature to those received in previous years. Thus in the majority of problems submitted relating to arable soils it was found that poor cropping was associated with soil acidity.

Some interesting cases of poor cropping on Lias and Oolite soils in Gloucestershire and on Chalk soils in Wiltshire have been investigated. One very interesting case of a crop failure in Somerset was reported. This was a case of a total failure of the swede crop in spite of liberal manurial treatment to the crop on a soil derived from the Upper Sandstone formation at Fitzhead, Somerset. It was found that the ground had been ploughed a little deeper than usual for the swede crop with the result that the newly turned up material proved toxic to the crop.

Enquiries on the subjects of the improvement of pastures and meadows have generally related to the desirability of applying phosphates and lime for this purpose.

Of the four cases of chlorosis of fruit trees submitted, two cases related to trees growing on soils derived from the Dolomitic Conglomerate, one case to trees on a Mountain Limestone soil, and one case to trees on an Oolite soil.

Experiments to discover a remedy for this condition have been arranged.

(2) *Miscellaneous Enquiries.*

It will be seen from the list of these enquiries that although they are very varied the great majority fall into the following categories :

(1) Enquiries relating to the manurial value and condition of fertilising materials.
(2) Enquiries relating to pastures.
(3) Enquiries relating to feeding stuffs.

SPECIAL INVESTIGATIONS IN PROGRESS.

(1) Field Experiments on "The Eradication of Bracken from Poor Moorland Pastures."

This investigation has been continued in conjunction with the Experiments Committee of the Bath and West and Southern Counties Agricultural Society.

(2) Field Experiments on "The Improvement of Poor Pastures where the Soils are Acid in Reaction,"—in conjunction with County Organisers and various farmers.

(3) Field Experiments as under on "The Manuring of Fruit Trees in Plantations and Grass Orchards."

(*a*) Effect of dung and potash manures on leaf scorch—in conjunction with the County Organiser for Worcester, the Horticultural Instructor for Hereford, and various fruit growers.

(*b*) Effect of phosphatic manures in a case where deficiency in phosphoric acid is indicated—in conjunction with the County Organiser for Worcester.

(*c*) Effect of autumn and spring dressings of nitrogen on apple trees—in conjunction with the County Organiser for Worcester.

(*d*) Effect of dressings of phosphates and potash on apple trees in grass orchards—in conjunction with the Agricultural Organiser for Gloucester.

(4) Field Experiments on "The Effect of Spraying with Sulphate of Iron on Chlorosis of Apple Trees and Black Currant Bushes"—in conjunction with the Horticultural Superintendent for Somerset.

(5) Experiments on "Liming of Arable Soils" under the scheme of the Ministry of Agriculture and Fisheries. Centres have been arranged as under :—

Hereford	3 centres
Gloucester	2 ,,
Worcester	1 centre

(6) Survey of Fruit Soils on the Old Red Sandstone formation in the West Midlands (under the scheme of the Ministry of Agriculture and Fisheries).

During the season of 1923 a preliminary survey was made of the soils of the area over which the investigation is being carried out. 267 soil samples were collected and the various points of these bearing on the particular problem are being examined in the laboratory.

ECONOMIC ENTOMOLOGY.

With the appointment of an Entomologist whose whole time can be given to Advisory Work it has been possible to get into closer touch with farmers and fruit growers and to obtain a clearer idea of the distribution of various insect pests in the different centres. It is hoped that as a result of coming into personal contact with growers on their own plantations an increasing use will be made of information which is available at the Institute.

The number of letters dealt with during the year was 80, the majority being from fruit growers. Somerset, as might be expected from its proximity to the Station, sent most, while Wiltshire sent one letter and one verbal message. The distribution of the enquiries which were dealt with is as follows :—

Gloucester	12
Hereford	13
Somerset	21
Wiltshire	2
Worcester	9
Other areas	23
Total	80

The very small amount of correspondence shows that not nearly as much use is made of the Station as there might be.

Naturally these figures give only a small indication of the actual amount of advisory work accomplished, a great many questions being dealt with in person, as a visit to a plantation to tackle one problem invariably leads on to the discussion or discovery of others, showing once more, if evidence were needed, the value of personal contact.

One of the chief difficulties of science applied to agriculture is to get the work of the laboratory into the field so that it may be used by the growers. It is in a general way very difficult to get people to write for advice or to state their troubles. As a rule it is only when making personal visits that one hears what these various troubles are. Conversely, a member of the Staff constantly in the field is able to keep the research workers in touch with the situation as it appears to the grower. During the nine months since the appointment of an advisory entomologist over sixty visits have been made either in reply to requests for advice or for the purpose of getting acquainted with farmers, fruit growers, and market gardeners.

One field experiment was organised and carried out, through the courtesy of a grower in Hereford, on spraying for Logan Beetle, *Byturus tomentosus.* This experiment was an extension of work already carried out at Long Ashton, where a very successful control of the beetle had been obtained. It was realised that before pushing the matter further it should be tried on a scale greater than was possible at Long Ashton.

Unfortunately, there was an unexpected scarcity of beetles in the plot selected for the experiment, but a very marked difference in the amount of infection between sprayed and unsprayed areas was shown. In the light of experience gained this year it is hoped that it will be possible to continue the experiment. The results are as follows :—

	Sprayed.	*Unsprayed.*
Percentage damaged ..	7%	21·4%
	14%	32·5%

The clay-coloured weevil, *Otiorhynchus picipes*, which had annually caused much damage to recently grafted stocks at Cheltenham, was completely controlled by spraying with lead arsenate. Preparations to meet it had been made in advance, and spraying was undertaken almost as soon as the beetle made its appearance.

The pests which created the most havoc this season were various species of Aphids, which were exceptionally destructive to plums, apples, currants and gooseberries. There was a very marked absence of Coccinellid and Syrphid larvæ until late in the seasons when all the damage had been done. This was presumably due to the cold early summer.

The abundance of apple sucker eggs, seen early in the year, gave promise of a heavy attack, which was amply fulfilled. Those trees which had been sprayed with a certain proprietary egg-killing wash were absolutely free, thus confirming the results obtained at Long Ashton.

The majority of grass orchards seen had suffered far less from aphids than those which were cultivated. This applied also to part of a plum orchard which had been under lucerne for three years.

In many parts of Hereford and Gloucester Winter Moth did a great deal of damage in spite of grease banding; spraying had to be resorted to. A certain number of growers are of the opinion that banding is not profitable as spraying has to be done in any case, but it would appear that spraying should not be necessary if banding is done in time. It is possible that Winter Moth came up earlier last year (1922) than usual, but on this point information is lacking.

Another line of investigation which was taken up late in the season in response to an appeal for help, was that of the pests of willows in South Somerset, where some 3,500 acres are devoted to willow growing.

Two species of the genera *Phytophaga*, *Phyllodecta* and *Calerucella* had done great damage to withy beds near Langport, reducing the value of the crop by about 50 per cent. As so often happens, the request for help came too late for anything to be done, but it is proposed to take the matter in hand next year.

The problem of " red plant " in strawberries, of which complaints were received from Cheddar, Tamar Valley, Hants, and other places, and which has been under observation for some time, was finally solved so far as identification of the casual organism is concerned. The more difficult problem of control is now being worked at, as is also the life history of the nematode which is the cause of the disease.

It has been finally proved that " red plant " and the already well-known " cauliflower " disease of strawberries are only part of the same disease, though different symptoms of it. Plants which have been marked down as " red " early in the season have later developed " cauliflower " symptoms and all intermediate stages have been identified. The results of this work have been published in the " Journal of Pomology " for July, 1923, and are also included in the present Report.

It will be observed that nearly all pests dealt with are those affecting fruit growers. This is due to two factors, firstly, that nearly the whole of the Bristol Province is devoted to some form of dairy farming or fruit farming, the latter often combined with market gardening, and, secondly, to the fact that farmers do not realise yet that Long Ashton is able to cater for their needs agriculturally as well as horticulturally for those of the fruit farmer. There remains the larger number of others who do not realise that it is possible to get advice from anywhere.

WILLOW CULTURE AND THE UTILISATION OF WILLOWS.

The total number of enquiries received during the year was 78, distributed as follows :—

Gloucester (including Bristol)	7
Hereford	0
Somerset	24
Wiltshire	2
Worcester	1
Other areas	44
	78

(*a*) *For the period* 1*st October*, 1922, *to* 12*th March*, 1923.

Enquiries.

Thirty-one enquiries on willow cultivation and crop management were answered. The advice sought was chiefly concerned with :—

(1) Suitable varieties of willows to plant, method of planting and general crop management under sewage conditions.

(2) The management of Cricket Bat willow plantations and methods of propagation of young trees.

(3) The marketing of willow rods.

(4) Suitable varieties for planting.

(5) Remedial measures for resisting Canker.

At the request of willow growers, visits were made in company with Mr. A. D. Cotton, the Ministry's Mycologist, to the Somerset willow-growing centre, with the object of ascertaining the cause of a serious spread of canker and of suggesting remedial measures. A circular advocating methods of treatment was prepared and forwarded to willow growers in the affected districts.

Ten enquiries were made by the Rural Industries Intelligence Bureau and one visit was paid on behalf of the Bureau to Paverham in order to ascertain the conditions of the willow-growing and basket-making industries in the district.

One public lecture on willow cultivation was given in Gloucestershire.

(*b*) *For the period* 12*th March*, 1923, *to September* 30*th*, 1923.

Enquiries.

Forty-seven enquiries were answered, and twenty-three visits made in connection with crop difficulties.

The enquiries were concerned with :—

(1) Crop management.

(2) Fungus and Insect attacks.

(3) Suitability of varieties for different soil conditions.

(4) Cricket Bat willow cultivation.

(5) Classification of varieties.

Fungus and Insect Attacks.

The serious canker outbreak in Somerset in the autumn of 1922, which was reported to the Ministry, did not recur in the autumn of 1923, but the spring attack occurred as in previous years.

A serious attack of canker due to *Physalospora*, was reported from Lancashire, where considerable damage had been caused on a hybrid variety locally grown and known as " Mawdsleys." Growers are being advised, as a result of observations made on the behaviour of the fungus,

(1) to cut closely,

(2) to avoid leaving diseased twigs on the ground after cutting,

(3) to spray the young crop in the spring with a fungicide.

Beetle attacks occurred on an extensive scale in the Somerset area. Visits were made to the affected crops in company with the Station's Advisory Entomologist and the beetles were identified as:—

(1) *Phyllodecta vitellina* on *Salix viminalis.*

(2) *Galerucella lineola* on *Salix triandra.*

Arrangements were made with the growers for the carrying out of remedial trials on the first appearance of the insects in 1924.

" Button Top " disease due to attacks by *Cecidomia sp.* occurred in Somerset, but less damage was done by the insect than in previous years.

Twenty-three enquiries were made in regard to the cultivation of the Cricket Bat willow—*Salix alba* var. *caerulea.* Suitable sets of this willow are now difficult to obtain and prices are high—£5 per 100 long sets being asked at the present time.

The basket-making industry of the country is depressed largely owing to the general depression in other industries, with the result that willow growers are experiencing difficulty in disposing of their willows at prices commensurate with the costs of production. Complaint has been made by Somerset growers that the prices they realise are too low in comparison with the prices paid by basket-makers because of the interposition of willow merchants to whom they have been accustomed in the past to sell their crops.

A marketing scheme, whereby the growers will supply the basket-makers of the country direct, *i.e.*, without the agency of the intermediate merchant, is contemplated.

Willows and willow products were exhibited at the Bath and West Agricultural Show and on two public inspection days at the Research Station.

A visit by the members of the National Cane and Willow Workers' Association was made to the Station when the willow plantation was inspected and the various aspects of willow cultivation discussed.

THE MANURING OF POOR PASTURES IN THE BRISTOL PROVINCE.

(*T. Wallace*).

The various problems relating to the management of grassland assume great importance in the five counties constituting the Bristol Province—Gloucestershire, Herefordshire, Somerset, Wiltshire and Worcestershire—where such a large acreage of land is utilised for permanent pasture and meadows in the production of milk and the breeding and rearing of cattle and sheep. In view of the great importance of these matters to the farmer, the various problems relating to the manuring of pastures in this area are being studied in connection with the Advisory Service of this Station.

This work has been in progress over four seasons and it is thought that the data obtained to date, though very incomplete, will be helpful to farmers and others who are endeavouring to improve their pastures.

Before presenting these data it will not be out of place to review very briefly some of the main results of experiments obtained on the manuring of pastures in the United Kingdom and to give some broad idea of the various aspects of this problem in the area under consideration. A list of references is appended for readers requiring more detailed information on the above experiments.

RESULTS OF EXPERIMENTS IN THE UNITED KINGDOM.

The main fact which has been brought out in practically every series of experiments has been the paramount importance of phosphatic fertilisers in effecting improvement of the herbage of pastures.

Phosphates appear to effect this improvement chiefly by stimulating the growth of leguminous plants, especially wild white clover, though it also appears that they may considerably increase the feeding quality of the grasses by direct stimulation of their growth and by indirect stimulation through their action on the leguminous plants of the pasture.

Basic slag and certain of the rock phosphates from North Africa have been shown to be, as a general rule, the most efficient of the phosphatic fertilisers for the purpose. Superphosphate alone has produced results equal to those produced by basic slag on some soils containing large supplies of carbonate of lime, but generally it has not be as efficient on limeless soils unless used in conjunction with lime.

The results with bone manures have been rather inconsistent.

Potash manures have often produced no results whatever on pastures where normally they would be expected to effect improvement, but in many cases they have proved valuable, especially on light soils and peaty soils.

Lime, when used alone, has generally produced no results, but when used in conjunction with phosphatic manures has often proved of great value.

Where no improvement has been effected from the addition of phosphates, the failure has generally been associated with the total absence of leguminous plants from the area or with the presence of a thick mat of coarse grass and partly decayed organic matter on the surface of the pasture which prevented the development of the useful leguminosæ.

THE PROBLEM IN THE BRISTOL PROVINCE.

The problem in this province is to ascertain how far the results obtained in previous experiments in other parts of the country are applicable to the various soil and climatic conditions which are met with in this area.

The soils of the area are very varied and of very diverse origin. There are soils derived from every geological series between the Upper Cretaceous series and the Wenlock series, whilst there are numerous drift and alluvial soils. From the point of view of texture, every type of soil is represented from the light chalk, sandy and gravelly soils to very heavy tenaceous clays. As examples of light soils the Chalk soils of the Wiltshire Downs, the Oolite soils of the Cotswolds, the light sandy soils of the Greensand and New Red Sandstone series, and the numerous river deposits which are present over the area, will serve ; the loams are widely represented by the soils of the Keuper Marl series, and by the heavier soils of the Old Red Sandstone formation ; lastly the heavy clays derived from the Lower Lias series, which are widely distributed over the area and certain heavy alluvial soils will serve as examples of the heaviest types of soils.

As regards the lime contents of the soils, these cover a very wide range, the soils derived from the Chalk and Oolite formations often containing very high percentages of carbonate of lime—up to 60% or 70%—whilst many of the soils derived from the sandstone formations, contain no carbonate of lime and are strongly acid to litmus.

As regards the climate of the area, the most notable fact in connection with the problem under consideration is the large difference between the annual rainfall in the south-west and north-east portions of it—reaching about 40 inches in the south-west, whilst averaging less than 30 inches in the north-east.

It would be expected under such varying conditions of soils and rainfall that pastures throughout the area would respond in different ways to any one treatment and hence it appeared desirable in studying the problem of the manuring of pastures in the province to collect soil data and to make observations on the effects produced on the pastures on these soils by different manures on as many soil types as possible in the various districts.

METHODS ADOPTED IN COLLECTING DATA.

The soil data which are presented in this paper have been obtained either from plots where experiments have been carried out by various Authorities or from cases which have come under the writer's notice while carrying out advisory duties. Very often in the latter cases the farmer has carried out the treatment as the result of a request for advice and sometimes the manuring has been carried out prior to the visit to the farm.

No data have been collected as to the actual financial gains or losses resulting from the treatments, but it has merely been noted whether substantial improvement to the herbage has resulted from the treatment as judged from the development of leguminous plants and the manner in which stock show increased liking for the herbage.

An attempt has been made in every case to obtain the following soil data : Moisture on air-dried sample, loss on ignition, mechanical composition, available potash*, available phosphoric acid,* carbonate of lime content or acidity (lime requirement). On many of these samples it has not been possible to carry out the whole of these determinations and where the samples have been taken after the manures have been applied—generally phosphates—the figures obtained for available phosphoric acid have, of course, no significance from the point of view of indicating probable deficiencies or otherwise of this material in the soils, but have been obtained only as a matter of interest.

Following these lines, the data already obtained are presented in Tables I. and II., and the various cases are discussed in detail below.

It should be said at this point that no cases have yet been studied to determine the responses obtained to the application of potash manures, the whole of the cases referring to centres where phosphates or lime have been applied.

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* Soluble in 1% Citric Acid Solution.

Table I.

No. of Sample.	Locality.	Geological Formation.	Description of Soil.	Moisture %	Loss on Ignition %	Available Potash (K_2O) %	Available Phosphoric Acid (P_2O_5) %	Carbonate of Lime ($CaCO_3$) %	Lime Requirement %
1	Almondsbury, Gloucestershire	Lower Lias	Heavy Clay			0.015	0.0054	2.0	Nil
2a	Maisemore Gloucestershire	Ditto	Ditto	4.33	9.00	0.025	0.0012	14.65	Nil
2b	" "	Ditto	Ditto	3.35	7.26	0.012	0.0219	7.70	Nil
3	Coaley, Gloucestershire	Ditto	Ditto	9.14	15.60	0.012	0.0097	Nil	0.439
4	Nempnett, Somerset	Ditto	Ditto			0.0152	0.0088	Nil	0.338
5	Yeovil, Somerset	Ditto	Ditto	5.79	12.08	0.0133	0.0093	1.18	Nil
6	Wootton Fitzpaine, Dorset	Ditto	Ditto	3.46	10.18	0.0279	0.0091	Nil	0.640
7	Tenbury, Worcestershire	Old Red Sandstone	Heavy Loam	2.12	5.08	0.0050	0.031*	Nil	Nil
8	Tyllwydd, Monmouth	Ditto	Ditto	1.64	4.35	0.0095	0.0078	Nil	0.146
9	Suckley, Worcestershire	Ditto	Fine Sandy Loam	1.97	4.96	0.0046	0.0121	Nil	0.185
10	Bromyard, Herefordshire	Ditto	Heavy Loam	2.59	5.86	0.0106	0.0051	0.5	Nil
11	Lydney, Gloucestershire	Ditto	Fine Sandy Loam	1.96	7.70	0.0174	0.0133	Nil	0.96
12	Bridge Sollars, Hereford	Ditto	Sandy Loam	1.77	5.34	0.0055	0.0127	Nil	Slightly acid
13	Winscombe, Somerset	Ditto	Sandy Loam, with Sand stones	2.64	7.74			Nil	0.376
14	Shepton Mallet, Somerset	Ditto	Ditto	3.15	10.16	0.0134	0.0106	Nil	0.584
15	Chipstable, Somerset	Devonian	Ditto	2.57	8.72	0.0330	0.0301*	Nil	0.451
16	Ditto, ditto	Ditto	Sandy Loam	3.10	10.44	0.0090	0.0055	Nil	0.314
17	Wrington, Somerset	Keuper Marl	Fine Sandy Loam			0.0084	0.0150	Trace	Nil
18	Newent, Gloucestershire	Ditto	Ditto	1.56	5.91	0.0095	0.0088	Nil	0.22
19	Red Marley, Gloucestershire	New Red Sandstone	Light Sandy Soil	0.76	2.26	0.0058	0.0170	Nil	0.030
20	Nailsea, Somerset	Peat over Coal Measures	Coarse Sand with Peat	11.40	21.32	0.0071	0.0123	Nil	0.557
21	Abberley, Worcestershire	Coal Measures	Clay	4.04	11.94	0.0136	0.0044	Nil	0.360
22	Nailsea, Somerset	Ditto	Ditto	2.60	9.06	0.0171	0.0072	Nil	0.649
23	Frampton Cotterell, Glos.	Ditto	Fine Sandy Loam	1.84	7.61	0.0094	0.016*	0.44	Nil
24	Paulton, Somerset	Rhaetic Beds	Sandy Loam	2.44	8.59	0.0216	0.0149	Nil	0.577
25	Winsford, Somerset	Devonian	Clay Loam with Shales	2.50	8.47	0.0105	0.0097	Nil	0.770
26	Long Ashton, Somerset	Carboniferous Limestone	Clay Loam	3.68	8.78	0.0076	0.0050	Nil	0.562
27	Ditto, ditto	Millstone Grit	Medium Loam with Grits	2.57	7.04	0.0057	0.0108	Nil	0.400
28	Turlake, Devon	Carboniferous Shale	Clay Loam	2.92	8.10	0.0102	0.0054	Nil	0.324
29	Bowerchalke, Wiltshire	Clay with Flints	Clay containing Flints	3.03	5.64	0.0075	0.0050	4.76	Nil
30	Malmesbury, Wiltshire	Oxford Clay	Heavy Clay	4.56	9.50	0.0092	0.0218	Nil	1.41
31	Ditto, ditto	Ditto	Ditto	4.76	11.48	0.0162	0.0088	Nil	1.37
32	Frome, Somerset	Greensand	Coarse Sand	3.10	9.06	0.0103	0.0115	Nil	0.658
33	Shrawley, Worcestershire	Alluvium	Fine Sandy Loam	2.26	5.82	0.0139	0.0057	Nil	0.257
34	Little Hereford, Herefordshire	Teme Alluvium	Ditto	2.11	5.38	0.0110	0.0073	Nil	0.297
35	Tenbury, Worcestershire	Ditto	Sandy Loam	3.08	7.36	0.0091	0.012	Nil	0.386
36	Orchard Portman, Somerset	Alluvium	Gravelly Loam	4.40	7.22	0.0193	0.0021	10.40	Nil
37	Madley, Herefordshire	Glacial Drift over Old Red Sandstone	Fine Sandy Loam	2.92	4.24	0.0050	0.0184	Nil	Nil
38	Oldcastle, Herefordshire	Ditto	Ditto	2.43	7.77	0.0085	0.0108	Nil	0.417

* Slagged previous to sampling.

TABLE II.

	No. of Sample.							
	No. 1	No. 5	No. 6	No. 8	No. 9	No. 11	No. 15	No. 19
	%	%	%	%	%	%	%	%
Surface Soil—								
Stones in Sample	Nil	Nil	Nil	Nil	0·50	2·00	20·00	**3·50**
Fine Gravel ..	0·65	0·28	0·31	1·08	0·40	0·74	9·17	**1·66**
Coarse Sand ..	12·29	1·60	0·71	2·15	3·35	24·06	9·66	**30.62**
Fine Sand	19·51	6·69	21·02	29·34	32·16	30·57	21·17	**49·74**
Silt.. . .	13·24	9·79	23·85	23·68	23·60	11·27	24·27	**4·57**
Fine Silt . .	16·42	26·98	24·65	22·40	22·98	16·12	18·20	**5·08**
Clay	24·33	34·22	13·86	14·31	9·36	6·82	4·17	**4·55**
Subsoil—								
Stones in Sample	—	Nil	Nil	Nil	Nil		60·00	**1·30**
Fine Gravel ..	—	Nil	0·32	0.41	0.23	—	14·53	**1·74**
Coarse Sand .	—	0·89	0·80	2·09	3·77	—	9·65	**32·79**
Fine Sand ..	—	4·49	24·88	25·06	38·91	–	20·65	**48·89**
Silt.. . ..	—	7·79	21·68	23·90	21·42	—	19·58	**4·40**
Fine Silt	—	25·00	22·74	25·94	19·80	-	22·04	**6·00**
Clay .. .	—	43·26	20·41	16·29	10·83	—	7·82	**4·20**

	No. of Sample.					
	No. 23	No. 26	No. 27	No 28	No. 37	**No 38**
	%	%	%	%	%	%
Surface Soil—						
Stones in Sample	Nil	Nil	13·80	7·80	7·50	**1·70**
Fine Gravel	1·07	1·60	4·09	3·50	1·72	**1·25**
Coarse Sand	11·35	4·45	8·97	10·97	6·09	**2·65**
Fine Sand	34·93	27·61	30·92	21·12	22·30	**21·95**
Silt	17·44	14·60	15·89	16·38	31·18	**32·65**
Fine Silt	18·08	18·00	16·89	25·32	25·25	**23·50**
Clay	5·32	19·72	10·49	10·46	7·50	**6·60**
Subsoil—						
Stones in Sample	Nil	Nil	19·00	1·00	—	**10·00**
Fine Gravel	0·96	2·08	8·66	2·89	—	**3·24**
Coarse Sand	11·80	4·83	9·82	3·70	—	**3·78**
Fine Sand	34·49	25·92	26·22	7·88	—	**20·66**
Silt	16·89	12·78	11·41	12·95	—	**34·25**
Fine Silt	18·92	16·74	14·81	33·30	—	**23·30**
Clay	9·70	28·11	20·81	30·90	—	**7·80**

Further, at some centres for which soil data are presented, no manurial treatments have been given. In such cases the data are of soils from poor pastures typical of some particular district, and they are included as showing possible reasons for the poor quality of such pastures.

Three of the centres for which data are given are outside of the Bristol Province.

DISCUSSION OF DATA.

For purposes of discussion, the various cases are grouped in the tables according to the geological origins of the soils, as under this system the soils fall into more or less well defined types which admit of comparisons.

Samples Nos. 1 to 6 are from the Lower Lias formation. These soils are typical of the Lias clays of the area, which are very widely distributed in Worcestershire, Gloucestershire and Somerset. The amount of clay in this type generally varies from 15% to 35% in the surface soil, and whilst the amount of carbonate of lime in the soil is generally high, this substance may be entirely lacking from the soil in certain areas. Pastures on this type of soil are often excellent, but in certain areas the herbage may be very thin and sparse, or, if the soil lies wet the grass may grow very rankly and be of little feeding value. The examples given are from fields where both types of herbage are found and in all cases—excluding Nos. 2a and 2b, where no treatment has been given—the application of phosphatic fertilisers—generally basic slag—has resulted in very marked improvement, those at Almondsbury and Nempnett being especially striking.

Cases Nos. 2a and 2b are of interest as showing the difference in the content of available phosphoric acid in soil samples from two parts of the same field—sample No. 2a being from the bad portion and No. 2b from the good portion.

The sample from Coaley was taken from a pasture with a very bad reputation, which responded to basic slag. This is a case where the herbage of the pasture before slagging was extremely coarse and ungrazed, and where since the application of slag the stock have eaten down the coarse grasses, and a good plant of clover has become established.

No. 6 sample was obtained from a bracken covered area, and is typical of an area which has not responded to liming, but which has been greatly improved by basic slag.

Samples Nos. 7 to 12 are typical examples of the close textured loams of the Old Red Sandstone series, which are widely distributed in Herefordshire and Worcestershire, and which occur to a less extent in Gloucestershire. These soils are generally deficient in lime excepting at points where cornstones occur. Pastures on soils of this type re-act very markedly to basic slag and cases have also been observed where mineral phosphates have given good results. The writer had an opportunity during the season of 1923 of making observations on numerous pastures on this type of soil, and in every case where trials had been made phosphates appeared to have effected great improvement.

Of the examples given, No. 10 is of interest as being a pasture in very poor condition, and No. 11 as an example of a soil with a very high lime requirement on which basic slag has produced a luxuriant development of wild white clover.

No. 12 is a case of a field which for two seasons after seeding down produced no clovers after which two dressings of basic slag, each at the rate of 5 cwts. per acre, were given, and resulted in the whole field being covered with a carpet of clovers.

Examples of soils derived from the Old Red Sandstone in Somerset are furnished by samples Nos. 13, 14. The samples were taken from the neighbourhood of the Mendips, where small areas of Old Red Sandstone soils occur. The soils over these areas are generally light, sandy and shallow, and are, as a rule, limeless and strongly acid in reaction. Pastures and meadows on this type of soil are naturally extremely poor.

Sample No. 13 is from a field which in three years was converted from a useless bracken covered tract into an excellent pasture, over which there was a carpet of wild white clover, by means of summer cutting of the bracken, applying basic slag at the rate of 5cwts. per acre, and subsequently grazing heavily with sheep.

No. 14 is from an extensive tract of land which a farmer is desirous of taking in hand, and where the soil is very similar to that at No. 13 centre.

Devonian soils occurring in the west of Somerset are represented by samples No. 15, 16 and 25.

Nos. 15 and 16 are from centres where experiments are in progress under the Agricultural Education Association to test the relative efficiencies of various types of basic slags and mineral phosphates for improving grassland.

At both centres all these various phosphates have effected great improvement in the quality of the herbage. The sample from No. 15 was taken from plots to which phosphates had been applied.

Two examples from the Keuper Marl formation are given in Nos. 17 and 18. No. 17 was taken from a field which had been mown for hay for many years and in which the herbage was in very poor condition. Considerable improvement was effected by basic slag. No. 18 is from a poor pasture infested with meadow saffron. which the farmer wishes to improve.

No. 19 is a sample from a poor meadow which is representative of the poorer meadows on a type of soil derived from the New Red Sandstone series which occurs around Newent, in Gloucestershire. The soil over this area is very light and sandy and often thin and overlying sandstone rock. Analyses of soil samples from this area show that for the greater part this type of soil has a fairly high "available phosphoric acid"—often 0.03%—contains some carbonate of lime, and is not acid. Queries have often been received regarding the reasons for the poor cropping on arable soils and the poor condition of grassland on this type of soil, and a trial to test the effects of kainit and slag on the example given has been arranged. The field is to be kept grazed during the period of the trial.

Examples from various types of soil derived from the Coal Measures, are given in samples No. 20 to No. 23. Such soils occur in relatively small patches in various districts of the province. Generally they are of a sandy or clayey nature and frequently are soils as in samples Nos. 20 to 23. No. 20 is from a very poor field which is generally cut for hay and the aftermath grazed until the field becomes too wet for stock. It was never manured of recent years until two years ago, when a dressing of bone meal was applied. The herbage appears to have been greatly improved by the dressing, clovers having appeared, whilst the colour of the grasses has been changed from a dull bluish green to a bright green. Slag was found to be very effective on a portion of the field from which sample No. 21 was taken when the field was used as a pasture. Where the pasture was untreated the herbage was very thin and of little value. The pasture was ploughed up during the war and on the area from which the sample was taken, total failures of successive oat, wheat and bean crops resulted. No. 22 sample was taken from a poor pasture, the greater part of which had been previously waterlogged, and over which area there is a thick mat of useless grasses and rushes. On a portion of this field, where the mat is not so thick, basic slag has been applied and has improved the herbage greatly. The centre is marked for further trials with lime and slag on the "mat" area.

The herbage of the pasture from which No. 23 sample was taken appeared to be of excellent quality, containing much clover, following the application of basic slag. The field was not seen previous to slagging, and the soil sample examined was taken after the slag had been applied.

Sample No. 24 is from the Rhætic Beds in Somerset. The sample is from a pasture which was in very poor condition, the grasses being very poor and clovers very sparse. Trials with slag and lime were carried out last season and the farmer reports that slag is effecting improvement.

Sample No. 25 was taken from a very poor pasture and is typical of the clay with shales soils derived from the Devonian formation which occur over the hilly area to the north of Dulverton. The grassland over this area is very hilly and much of it is very poor and covered with bracken. The writer has observed several cases where pastures have been greatly improved by basic slag on this type of soil. A trial with phosphates and lime has been arranged for the coming season on a very sour pasture in this area.

No. 26 is representative of the soils overlying the masses of Mountain Limestone which occur in Somerset. They are generally found at high altitudes and are sour and covered with bracken. On the pasture from which this sample was taken a dressing of high grade basic slag at 7 cwts. per acre produced a luxuriant growth of wild white clover, whilst no improvement can be observed after two seasons from a dressing of ground burnt lime applied at the rate calculated to satisfy the lime requirement given in Table I.

The centre from which sample No. 27 was taken was covered with a dense growth of bracken three years ago. This has been cleared by cutting, and trials with phosphates and lime have been carried out with a view to converting the area into a useful pasture. Basic slag, supplying 150 lbs. of phosphoric acid (P_2O_5) per acre, followed by grazing with sheep, has converted a portion of the area into a useful pasture full of white clover, whilst Nauru phosphate, applied to a second portion to supply the same amount of phosphoric acid (P_2O_5) as the slag, has also encouraged the leguminous plants, but has not been so effective as slag. Another portion of the area which received a dressing of ground burnt lime, at the rate of 48 cwts. per acre, does not appear to have responded to this treatment up to the present, and the stock do not graze it any better than where no manure has been applied.

Sample No. 28 is from a very poor pasture in Devon and is included as similar poor pastures exist in the south west of Somerset on this type of soil. The figure obtained for available phosphoric acid suggests that these pastures will probably be improved by phosphatic fertilisers.

Sample No. 29 was taken from a very poor pasture, much of which was covered with thin poor grass. A dressing of basic slag was advised to effect improvement and the application of this fertiliser resulted in a good development of white clover during the first season after application. It is of interest to know that in a portion of the arable field adjoining this pasture, where swedes were manured with superphosphate a normal crop was obtained, whereas where phosphates were omitted from the manurial dressing given the swedes were a very poor crop.

The two fields from which samples No. 30 and 31 were taken are of great interest. It will be noted from Table I. that both samples are very strongly acid—their lime requirements are the highest yet met with in the Bristol province. These two fields adjoin one another and are classed as pasture. When visited by the writer during August, 1922, No. 30 had no grass growing on it, but its surface was covered with hawkbit and dried out mosses, and lichens, with a few stunted gorse bushes scattered over it. The herbage of No. 31 consisted of tufts of coarse, useless grass, rushes and gorse bushes. These are fields where it will be possible to test the effects of lime and phosphates under strongly acid conditions and in the presence of a thick mat of organic matter.

Sample No. 32, which is a coarse textured Greensand, is typical of the soils of many of the pastures found on this formation in Somerset and Wiltshire. The soils are generally very strongly acid and so far no data have been collected as to the effect of manures on these pastures. Wild white clover, however, has been observed to grow very freely on this type of soil, whilst many cases of arable crop failures on such soils in the area have been overcome by liming.

Samples No. 33 to 38 are examples of some of the alluvial soils of various origins taken from different districts of the province. No. 33 is probably mostly of New Red Sandstone origin. The sample was taken from a series of demonstration plots where different phosphatic fertilisers are being tested. It is of interest to note that at this centre, where the soil is acid and apparently poor in phosphates, bone flour, basic slag and Gafsa phosphate have all been effective—bone flour giving the best results.

On the meadows, from which sample No. 34 was taken, trials with superphosphate and sulphate of ammonia had been carried out by the farmer with practically no result. It should be noted that this is a case where superphosphate has not been effective where the soil is apparently poorly supplied with phosphates, but is also acid in reaction. A trial with basic slag has been recommended. The soil is probably largely of Silurian origin.

Sample No. 35 is from a Teme meadow where the grass is very coarse and rank and as a result of this stock do not eat it down. Slag has been applied to a portion of this field and where this has been done the cattle have grazed much more closely, the grasses are becoming finer and white clover is developing well.

The case in connection with which No. 36 sample was taken was very interesting. The sample was one of a number taken from some arable fields in which the farmers had often experienced crop failures. All samples were shown to contain large supplies of carbonate of lime and extremely low amounts of available phosphates.

The field adjoining that from which the sample was taken was very poor pasture and efforts were being made to improve it by applying basic slag. When examined during the first season after the application of basic slag, it was noted that the effect of the slag had been to produce a very dense growth of bird's foot trefoil and some white clovers.

Samples Nos. 37 and 38 were taken from a drift area in Herefordshire, where the soil is probably largely of Silurian and Old Red Sandstone origin. There is a fairly large area of this type of soil around the Wye Valley in the west of Hereford. These soils are generally acid and where arable crops are grown it is generally essential to lime the land occasionally or certain crops fail.

At Centre No. 37 the field had been ploughed up during the war and was seeded down in 1919 or 1920. When inspected in 1922 the face of the pasture was extremely bare, and clovers were practically absent. A portion of the field was slagged in the autumn of 1922, and during the summer of 1923 the slagged area became covered with white and red clovers and afforded a large amount of keep.

Sample No. 38 is from a poor meadow which has been chosen for an experiment on the liming of grassland.

SUMMARY OF RESULTS.

There are several points which arise from the soil data and foregoing discussion of the particular cases to which it appears desirable to draw attention. The most important of these are as under :—

1.—The analytical figures obtained for available phosphoric acid in the soils of the great majority of these poor pastures would be considered as being low and as indicating the probable need for phosphatic manuring (7). There is one case—No. 37—where the figure approaches that suggested by Wood and Berry as possibly being the upper limit at which phosphates may be expected to act, where basic slag has been found to be very effective.

At one centre—No. 30—where the available phosphoric acid would be regarded as satisfactory the pasture is useless. Here, however, the lime requirement is extremely high.

2.—There are a number of cases where the figure obtained for available potash would be considered low and where phosphatic fertilisers alone have effected marked improvements.

It has not been determined at these centres whether potassic manures would effect further improvement.

3.—The data furnish examples of soils containing large supplies of carbonate of lime, and of soils containing no carbonate of lime and which are acid in reaction, on which the pastures have been improved by the use of certain phosphatic fertilisers used alone—chiefly basic slag. On some of the acid soils lime used alone has failed to effect visible improvement of the herbage, whereas basic slag has effected great improvement. It should be noted, however, that the analytical data for these soils have also indicated poor supplies of available phosphates. It remains to be seen whether lime and phosphates would be more efficient in effecting improvement on some of these acid soils than phosphates alone.

CONCLUSIONS.

1.—From the foregoing limited amount of data it would appear that phosphatic fertilisers—generally basic slag—are efficient in effecting improvement of the herbage of many of the poor pastures met with in the Bristol Province.

2.—Basic slag used alone will effect improvement of pastures on soils containing carbonate of lime and on acid soils, but cases of the latter have been met with where further trials are necessary before a general statement can be made as to whether basic slag alone will always be effective on such soils.

3.—This fertiliser has also proved effective on several soils containing apparently only poor supplies of available potash—but again there are certain light soils on which further experiments are required.

4.—Where lime alone has been applied to pastures on sour soils the herbage does not appear to have been materially improved.

RECOMMENDATIONS.

From the results already obtained and presented in this paper one can reasonably recommend to farmers who are desirous of improving any poor pastures where the soil is not waterlogged or extremely light, to commence by making trials with dressings of the higher grade basic slags—30%to 38%—at the rate of 7 to 10 cwts. per acre on small areas of the pastures and to ensure that the area is adequately stocked, preferably with cattle and sheep, during the season following the application of the fertiliser. If finely ground mineral phosphates, such as Gafsa phosphate, are obtainable, these may be reasonably expected to react on soils where basic slag will effect improvement.

If this treatment is without effect, then it will be necessary to ascertain whether the case is one in which further treatment with lime or potash manures is likely to be necessary or whether it is a case such as quoted by Gilchrist (1) where no system of manuring is likely to give an economical return.

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THE BUFFING OF WILLOWS.

(H. P. Hutchinson.)

The buffing of willows is an operation whereby, after a prolonged boiling in water, a mineral-brown colour is imparted to the wood of willow rods.

The process now in general commercial use is the outcome of a chance discovery made by a willow grower—John Marshall, of Sutton-on-Trent, Notts.—about the year 1860, who found that as a result of boiling, dried willows could be peeled at any period of the year. The colour which was developed in the wood of the peeled rods was believed to have been due to the action of urine in which the rods were, for some years, boiled, but at a later date it was ascertained that water produced the same effect.

Before the buffing process became generally known, peeling was only possible for short periods in the spring of the year, and all peeled rods were " white " in colour. At the present day " white " peeling, even by the aid of retardation methods, is only possible for a few weeks from the time of commencement of annual growth, owing to the rapid production of new wood. This layer forms as a " rind," which for a time does not possess permanent wood characters and is not in complete union with the outer layer of wood of the previous year. Being detachable from the latter it is spoken of by willow growers as " double skin " or " second skin." When the presence of this layer has become evident " white " peeling is stopped because such " double-skinned " rods split at the surfaces of union of the new wood with the old and because of discolorations which develop. The production of white rods was thus limited to the time during which the process could be carried out and any rods remaining unpeeled at the close of the peeling season were available for use only as " brown," *i.é.*, with the bark on, and at a low price.

The introduction of buffing had the economic effects

(1) of enabling a greater proportion of the willow crop to be peeled, since it permitted an extension of the operation through the year.
(2) of rendering possible a greater distribution of wages and better financial returns to the grower.
(3) of supplying basket makers with a new material suitable for use in the industry.

Although the operation may be performed continuously throughout the year, it is the practice amongst willow growers to cease buffing for the few weeks when peeling for " white " can be carried out and to return to buffing when the production of " white " is no longer possible.

A buffing plant consists of a boiling tank, rectangular in section, and suited in size to the quantity and size of the rods to be boiled in it. The smallest tanks will contain about half a ton of green rods ; those of the largest size have a capacity for over two tons. A tank 12 feet long, 3 feet wide and 4 feet deep is capable of holding 25 to 30 cwts. of rods and is of the size generally used. The material of which the tank is constructed usually consists of iron plates ⅛—3-16th inches in thickness, welded or rivetted together, but tanks constructed of wood planks 2½—3 inches in thickness bolted together and to a bottom iron plate are in use in the North of England. In this case the structure is made water-tight by the use of red lead at the joints.

The tank is set in brickwork in a similar way to that adopted in the case of a kitchen copper, but generally the bottom of the tank rests on an iron plate which forms the roof of the furnace, its purpose being to protect the tank bottom from the injury which would be caused by the direct flames of the fire. The furnace chamber is continued as a flue which connects with a chimney stack, as a direct straight run in the case of the smaller tanks, but in the case of many tanks of the larger size the flue is made to return in the brickwork of the setting so passing round the tank in the form of a low spiral before opening into the chimney. The object in the latter method of construction is to avoid waste of heat. In most cases the tank is provided with a ventilated roof placed sufficiently high to avoid inconvenience in handling the bundles of rods when filling, to keep out rain and to enable peeling to be performed by workers standing at the sides.

In filling the tank bundles of willows are placed lengthwise and covered with water. The bundles are packed together tightly by means of pressure applied on the upper layer, the object being to fill the tank with willows to its utmost capacity. Various devices are in use for securing the necessary pressure, one of the most efficient consisting of a stout pole made to act as a level of the Second Principle where the fulcrum is situated at the chimney end of the tank (being hooked to a firmly set ring) the power being applied in a downward direction at the other end of the pole, and the pressure on the rods transmitted through a T-shaped block of wood placed midway of the length of the tank. The rods are kept submerged by arranging for the handle end of the pole to be caught up by an iron hook set in the brickwork of the boiler. Many boilers are flanged in an inward direction on their upper edges, which, by securing the ends of short planks placed transversely across the bundles, keeps the latter submerged. The top of the tank is provided with flat wooden covers, which serve to avoid loss of water as steam.

The rods are boiled continuously for from two to five hours. A tank filled in the afternoon can be brought to boiling point before the workers leave work. Attention to the fire is again needed (the furnace being damped down) later in the evening, after which boiling will be steadily maintained for several hours and the water will still be warm, and the fire capable of being revived, if necessary, in the morning.

Rods are peeled in the " warm " or " cold " condition. In the former method the peelers stand alongside the tanks and pick out from the water (kept warm by suitably controlling furnace heat), individual rods. The bark is easily removed by a dexterous twist of the wrist and fingers without further agency.

In some cases the peelers work at tables placed near the boilers and are supplied with rods by an attendant who removes the bundles from the boiler when required.

This system is satisfactory when the bundles are small and the rods short, but a large bundle of long rods becomes cold before it is finished, the peeling becoming progressively more difficult with decrease in temperature.

In cases where a grower does not possess a boiling tank. his crop of rods may be boiled by a boiler owner in the district and afterwards returned to be peeled at home. Such rods, being " cold," require the use of a " break " for bark removal. Peeling is then performed at a slower rate and the rods are frequently considerably damaged by being split, due to the pressure exerted by the " break."

The peeled rods are " sorted," *i.e.*, branched and damaged rods are removed, and afterwards " drafted," *i.e.*, " graded " according to length.

The graded rods are immediately exposed to sunlight, being supported in an inclined position against rails or fences. By this means the required intensity in depth of buff colour is produced and drying of the rods is effected. The time of exposure in the open air varies with the amount of sunlight obtainable and with the moisture content of the atmosphere. In some cases the rods may be ready for removal in two or three days, while in other cases three weeks' exposure may be necessary before the required depth and colour is reached.

Further drying is generally required, especially during the winter months, before the rods are in a proper condition for storage. They are placed on racks in a heated room where the heat is supplied by stoves or by hot pipes connected with a boiler. When thoroughly dry the rods are securely tied in bundles, which are stored in dry quarters.

The investigations made at Long Ashton in the direction of ascertaining the reasons why boiling facilitates the removal of bark and why a permanent colour is induced in the underlying wood, have led to the following conclusions.

The effect of soaking dry willow rods in cold water for a sufficient length of time is to cause a swelling of the bark, due to its absorptive character, a release of cell products and a loss in the power of adherence of the bark to the wood, which is so far diminished as to permit of its ready removal. Boiling causes an increase in the rate at which penetration by water and the decomposition of cell products occur, the ease with which peeling can be performed being increased with the time during which the boiling is allowed to continue.

The colouring of the wood is primarily due to the presence of catechol, pyrogallol, and probably other similar aromatic compounds, which are formed as decomposition products of more complex tannin compounds present as natural products of cell activity in the rods. Such compounds exist in largest amount in the cells of the cortex, but are also present in certain cells of the wood. The effect of boiling is to cause rapid decomposition and the simpler compounds thereby formed are liberated from the containing cells and become distributed in the tissues of the wood.

Catechol and pyrogallol absorb oxygen, the absorption being accompanied by the formation of a brown coloration.

The oxygen supply present in the water in which the rods are boiled would explain the presence of the buff colour generally present in the wood when freshly peeled. The colour deepens on exposure to the air on account of further oxidation, which then takes place.

It is known that different varieties of willows give varied shades of buff even when under similar conditions. Generally varieties of *Salix triandra* buff readily—a three hours' boil and an air exposure for two or three days being found to be sufficient for the formation of a satisfactory colour. The rods of *Salix viminalis* (Osiers) give a paler buff with tendency to yellowing under the same treatment, while rods of *Salix purpurea* require longer boiling and generally several weeks exposure to light before the right colour is obtained. The different varieties of willows, even those varieties belonging to the same species, show differences in the degree of colour intensity in their buffed rods when grown on the same kind of soil, but great differences in colour are shown by the same variety when grown on different soils. For example, the variety, Black Maul (*Salix triandra*) produces a rich deep buff when grown on clay, but it is only by long continued boiling and air exposure that even a pale shade of buff can be obtained when the variety is grown on peaty land.

Catechol and pyrogallol very readily absorb oxygen from the air when in alkaline media, with corresponding rapid formation of a dark-brown colour.

On this evidence it was thought probable that freshly boiled and peeled rods would darken in colour when treated with alkali. Experiment proved this to be the case and as a result of trials made with various strengths of different alkali solutions, it was ultimately found that lime water possessed sufficient alkalinity to give a colour similar to commercial buff to a boiled and peeled willow rod when placed in it for a few minutes. The buff colour appears almost instantly when the lime water is warm.

It was also found that the boiling process need not be continued for longer than one hour (in several cases half an hour's boiling was found to be sufficient) in order to obtain release of the colour-forming products from the cells of the bark and their impregnation of the underlying wood.

In the case of the variety, "Dicky Meadows," and of the other varieties of *Salix purpurea*—all of which buff slowly under present methods—the lime water treatment produces a darker buff than is produced in the case of any other variety of any species buffed under the existing system, but the colour formation can be controlled by the use of lime water of weaker strength and by boiling the rods for a shorter length of time.

In an industrial application of the method which had been described, it seems probable that a considerable reduction in the costs of production of buff rods could be made in that the length of time now found to be necessary to take in boiling and as outdoor exposure could be greatly shortened.

Since it has also been found that steam-heated willows produce a buff similar to that obtained by the boiling method, industrial development on these lines would probably lead to the substitution of steam for hot water. In such a case the present furnace and tank setting would be unnecessary as a low pressure boiler could be used to produce sufficient steam for the treatment of willows in the tank.

POT EXPERIMENTS ON THE MANURING OF FRUIT TREES.

III.

(T. WALLACE.)

During the past season the experiments with apple trees, gooseberry and black currant bushes and strawberry plants described in the Annual Reports for 1921, 1922, were continued, and two further experiments—one with raspberry plants and the other with apple trees—were commenced.

The experiment with raspberry plants was conducted along the same lines as the experiments on apple trees, gooseberry bushes, etc., with the object of studying the effects produced on the plants from the deficiencies of the various plant foods.

The new experiment with apple trees was commenced primarily to study the effects produced on the character of the foliage and on the growth of the trees by varying the ratios of certain of the elements of plant food contained in the complete nutrient solution originally used.

It was considered desirable to carry out such an experiment as it had been found in the previous work with apple trees that the trees fed with the complete natrient solution did not behave in an altogether satisfactory way.

Thus in previous years trees under this treatment had become affected with leaf scorch and in some cases they had shed the scorched foliage during the hot weather in July. Further, it had been shown that when potash was omitted from the complete nutrient solution and trees fed with this solution they had developed leaf scorch very severely, whereas when nitrogen was omitted from the complete nutrient solution and trees fed with this solution their foliage never became affected with scorch.

From these observations it appeared that a more satisfactory nutrient solution for this work might be obtained by narrowing the ratio $\frac{\text{Nitrogen}}{\text{Potash}}$ in the original complete nutrient solution.

It was also thought that in these cultures of coarse sand it might be advantageous to introduce a soluble silicate into the nutrient solution and it was decided to test this point.

The experiment, as conducted during the season, together with the results obtained, are described later in this paper.

The data collected from the various experiments during the season were similar in character to those described for the season 1922 and as the trees, bushes and plants undergoing the various treatments have behaved very similarly to what they did during the previous season it is not proposed to describe the observations made in detail, but to deal more especially with the more striking of the results obtained and with certain special features.

It is now becoming apparent from these experiments that the effects produced on the various plants by withholding any given element are similar though they may be more marked in some plants than in others.

As an example, the effects produced on the various plants by the withholding of phosphoric acid from the plant may be taken.

In every case where this treatment has been given the plants undergoing treatment have made excellent growth during the initial stages of the experiment—generally up to the middle of the first season. The foliage of the plants then commences to show characteristic bronze or purple tints, and the plants are defoliated prematurely. Cropping during the first or second season may not be greatly affected, but as time goes on all lateral buds become very weak, flower buds fail to break strongly and the fruits produced are very small in size and number. Finally, foliage is produced only near the terminal buds of the shoots. In the case of strawberry plants there is a tendency for the plants to form only single crowns.

The fact that some plants suffer more than others from a given deficiency is well illustrated by the behaviour of certain plants to potash starvation.

Apple trees, gooseberry bushes and raspberry plants make very poor growth from a very early stage when potash is omitted from the nutrient solution, whereas black currant bushes and strawberry plants do not appear to suffer to such an extent. although they actually show similar symptoms of the deficiency of the element as do the former group of plants.

The more important of the observations made in the experiments during the season are given in the following notes on the respective experiments.

Weather during 1923 *Season.*

The weather during the growing season was not very favourable for the growth of the trees and bushes. Up to the middle of March it was generally very wet and there was little sunshine. From the latter date until the end of May the temperature remained low, and although there was little rain the amount of sunshine was small. Cold east winds prevailed during this period and during the week ending May 20th there were very severe frosts, accompanied by hailstorms, which did a certain amount of damage to the plants under experiment.

During the latter part of June and during July there were periods of hot, dry weather.

From August onwards the season was very wet and there were few days of bright sunshine. Hard frosts were experienced during the beginning of November.

Experiments on Apple Trees—Commenced 1921.

The foliage of the trees undergoing the various treatments showed the distinctive characters exhibited in previous seasons.

The trees in the series where nitrogen and phosphoric acid respectively were omitted and where only rain water was given, were later in blossoming and in coming into leaf than were those of the other series. The blossoms produced in these former series were also extremely weak.

In the series where potash treatment was omitted the trees showed leaf scorch early in the season. The trees of the following four series were defoliated prematurely—"rain water only," "nitrogen omitted," "phosphoric acid omitted," "magnesium omitted." There was much dying back of shoots noted near the end of the season on the trees in the "rain water only" series and in the "omission of phosphoric acid" series.

The shoot growth made during the season in all series was very poor, possibly because of the trees not having been pruned since spring, 1921. and it is proposed to cut back the shoots very hard this spring to attempt to induce new shoot growth in order to obtain further data on the types of shoots produced now that the trees are showing the starvation symptoms to a very marked extent.

Experiment on Gooseberry Bushes—Commenced 1922.

In this experiment observations were made during the season on general growth and foliage characters and cropping data were obtained.

At the end of season, 1922, two bushes per series were lifted for root examination and these were root pruned at that time and returned to their pots. These plants were turned out of their respective pots at the end of the present season when the root systems were again examined. This treatment is to be repeated in 1924.

As regards growth characters, types of foliage, order of defoliation of the plants of the various series, the observations made were similar to those made in 1922. It should be observed, however, that in the omission of phosphoric acid series there was practically no new shoot growth in 1923, whereas in 1922—the first season of the experiment—the shoot growth made in the early part of the season, presumably before the reserves of phosphoric acid in the plant were exhausted, was considerable. The plants in the following series were in much the worst condition at the end of the season—"rain water only," "nitrogen omitted," "phosphoric acid omitted."

The plants of the "potash omitted" series all showed marked leaf scorch during the greater part of the season and some of these plants are now in poor condition.

Cropping.

Cropping data for the season are presented in the following table:

TABLE I.

CROPPING OF GOOSEBERRY BUSHES.—SEASON 1923.

Treatment.	Complete Nutrient Solution.	Nitrogen omitted.	Potash omitted.	Phosphoric acid omitted.	Calcium omitted.	Magnesium omitted.	Rain-water only.
Number of bushes under treatment	10	10	10	10	10	10	10
Total number of fruits ..	256	65	329	390	181	298	125
Total weight of fruits (grammes)	565.9	74.2	774.1	533.8	489.9	887.7	147.2
Average weight per fruit (grammes)	2.18	1.14	2.35	1.37	2.70	2.98	1.18

As 1923 was the first season that a crop was taken from the plants the order of cropping shown in the table will not necessarily indicate which treatments will ultimately affect the cropping powers of the plants to the greatest extent. It is, however, of interest to note that the size of the fruits in the series "rain water only," "nitrogen omitted," and "phosphoric acid omitted," have been reduced below normal size even at this early stage.

Root Systems.

The examination of the root systems made by the root pruned bushes during 1923 was made on January 1st, 1924. The more important observations made were as follows:

Complete Nutrient Solution Series.—The root systems were large and consisted of plenty of strong coarse fibres well furnished with healthy fine fibres along their entire lengths.

Nitrogen Omitted.—The root systems were small. Both coarse and fine fibres were lacking and the fibres were comparatively thin. The fine fibres were yellow in colour.

Potash Omitted.—The root systems were of medium size. The coarse fibres appeared to be normal but the fine fibres were lacking in amount and were thinner than in the "complete nutrient" series.

Phosphoric Acid Omitted.—The root systems were small and both coarse and fine fibres were poorly developed. The colour of the fibres was a characteristic brown.

Calcium Omitted.—The two root systems were very different in size—one was large and the other small. Fine fibres were well developed on these roots. The roots appeared to have made more recent growth than in any other series.

Magnesium Omitted.—The root systems were large and there was plenty of both coarse and fine fibres. The roots, however, were brown in colour and careful examination showed that a large proportion of the fibres were dead at the tips.

Rain Water Only Series.—The root systems were similar in size and appearance to those in the series where nitrogen was omitted. There was a deficiency of coarse fibres and all the fibres were thin and had a starved appearance.

Experiment on Black Currant Bushes.—Commenced 1922.

The observations recorded in this experiment on the behaviour of the bushes during the season were similar to those made in the experiment on the gooseberry bushes.

The bushes behaved very much like the gooseberry bushes receiving the same treatments, those in the " rain water only " series and " nitrogen omitted " and " phosphoric acid omitted " series making very poor growth and being defoliated at a much earlier date than those in the other series.

The plants receiving " no potash " treatment showed very marked leaf scorch towards the end of the season and once more it was demonstrated that where plants are grown in pots which are not leached at intervals these plants develop leaf scorch more quickly than where leaching is carried out.

Some of the plants suffered severely during the season from aphides' attacks.

The cropping data for the plants are given in Table II.

TABLE II.

CROPPING OF BLACK CURRANT BUSHES.—SEASON 1923.

Treatment.	Complete Nutrient Solution.	Nitrogen omitted.	Potash omitted.	Phosphoric acid omitted.	Calcium omitted.	Magnesium omitted.	Rain-water only.
Number of bushes under treatment	10	10	10	10	10	10	10
Total number of fruits ..	828	113	644	381	1076	951	105
Total weight of fruits (grammes)	497.5	34.7	257.7	113.8	611.3	536.0	33.6
Average weight per fruit (grammes)	0.60	0.31	0.40	0.30	0.57	0.56	0.32

As in the experiment with the gooseberry plants. 1923, was the first season that crop weights were taken.

Here again it will be noted that the size of the fruits in the series "rain water only," "nitrogen omitted" and "phosphoric acid omitted," is much less than in the other series, whilst the actual crop weights obtained from the plants in these series have been already greatly affected by the treatments given.

The lateral buds on the shoots of the plants in these series were much smaller than those on the plants in the other series at the end of this season and doubtlessly very poor crops will be obtained from these plants in future seasons.

Root Systems.

The root systems made during 1923 by the bushes set aside for the purpose of studying the effects of the treatments on the development of the root systems were examined on January 1st, 1924. The various characters exhibited by the root systems of the different series were very similar to those shown by the root systems of the gooseberry bushes in the corresponding series and hence it is not necessary to describe these root systems in great detail. It will suffice to say that the root systems of the plants of the three series—"rain water only," "nitrogen omitted," "phosphoric acid omitted"—were much smaller than those of the plants in the other series: the fibre of those receiving "no phosphoric acid" treatment showed the characteristic yellow and brown colourations; the root systems of the "potash omitted" series were fairly well developed but the fine fibres were lacking to a certain extent; whilst the series receiving "no calcuim" treatment showed much recent growth of fibre and the series where magnesium was omitted showed evidence of root killing.

Experiment on Strawberry Plants.—Commenced 1921.

The plants in this experiment have shown similar growth characters to those exhibited in the two previous seasons.

At the beginning of the season the plants in the following series made the most rapid growth—"complete nutrient," "potash omitted," and "calcium omitted"—the plants in the series receiving "no magnesium" treatment were somewhat behind these whilst those in the series receiving "no nitrogen" and "no phosphoric acid" treatments respectively and those receiving "rain water only" were decidedly behind.

During the height of the growing season the plants in the three series receiving the "complete nutrient," "calcium omitted," and

" magnesium omitted " treatments respectively were the largest plants ; those receiving the " potash omitted " treatment came next in order of growth, whilst the plants of the " no phosphoric acid " series were much smaller than these, and those of the " no nitrogen " series and " rain water only " series were smallest of all.

Towards the end of the growing season the plants in the " no potash " series again came forward in the order of growth among the series whilst the plants receiving the " no magnesium " treatment became very dwarfed as in previous seasons.

During the season the plants under the various treatments showed the characteristic tints which had been noted in previous years and which are described in the previous reports.

Cropping Data.

Cropping data have been collected for these plants for three seasons and are presented in Table III.

TABLE III.

CROPPING OF STRAWBERRY PLANTS.—SEASONS 1921-1923.

Season 1921.

Treatment.	Complete Nutrient Solution.	Nitrogen omitted.	Potash omitted.	Phosphoric acid omitted.	Calcium omitted.	Magnesium omitted.	Rain-water only.
Number of plants under treatment	10	8	10	9	10	10	10
Total number of fruits ..	131	49	76	83	90	119	51
Total weight of fruit (grammes)	513.8	191.4	279.2	356.1	358.8	483.4	170.6
Average weight of fruit per plant (grammes) ..	51.4	23.9	27.9	34.0	35.9	48.3	17.1
Average weight per fruit ..	3.92	3.91	3.67	4.29	3.99	4.06	3.34

Season 1922.

Treatment.	**Complete Nutrient Solution.**	**Nitrogen omitted.**	**Potash omitted.**	**Phosphoric acid omitted.**	**Calcium omitted.**	**Magnesium omitted.**	**Rain-water only.**
Number of plants under treatment	10	6	9	7	8	8	9
Total number of fruits	91	10	67	39	42	60	7
Total weight of fruit (grammes)	266.8	18.4	193.8	85.3	114.4	174.4	12.1
Average weight of fruit per plant (grammes) ..	29.6	3.1	21.5	12.2	14.3	21.8	1.1
Average weight per fruit ..	2.93	1.84	2.89	2.19	2.72	2.91	1.73

Season 1923.

Treatment.	**Complete Nutrient Solution.**	**Nitrogen omitted.**	**Potash omitted.**	**Phosphoric acid omitted.**	**Calcium omitted.**	**Magnesium omitted.**	**Rain-water only.**
Number of plants under treatment	10	5	9	6	8	8	8
Total number of fruits ..	110	3	87	32	136	92	9
Total weight of fruit (grammes)	471.0	9.7	345.4	116.6	554.3	321.3	24.6
Average weight of fruit per plant (grammes) ..	47.1	1.9	38.4	19.4	69.3	40.2	3.1
Average weight per fruit ..	4.28	3.23	3.97	3.64	4.08	3.49	2.73

TOTAL CROP FOR THREE SEASONS.

Total number of fruits	332	62	230	154	268	271	67
Total weight of fruits (grammes)	1251.6	219.5	818.4	558.0	1027.5	979.1	207;3

Examination of the data relating to the total crops obtained shows that the smallest crops have been obtained in the three series where the plants have received the treatments "rain water only," "nitrogen omitted" and "phosphoric acid omitted" respectively.

It should be noted in studying these data that during the third season only five plants remained alive in the " nitrogen omitted " series and six in the " phosphoric acid omitted " series.

Consideration of the data for each season shows very clearly that the omission of nitrogen and phosphoric acid respectively from the complete nutrient solution have affected the fruiting of the plants to a greater extent than any other treatment excepting the starvation treatment given where rain water only is supplied.

Experiments on Raspberry Plants.—Commenced 1923.

For this experiment ten plants—variety, Pyne's Royal—were selected for each treatment and these were potted up in silver sand contained in waxed 10in. pots in February, 1923.

Previous to potting, all the plants were root pruned and after potting the canes were cut down to within a few inches above the level of the sand in the pots.

A loose tarpaulin cover was placed over each pot to shade the sand. These could not be secured in permanent positions to protect the contents of the pots from rain owing to the growth of new shoots during the season and thus it was necessary to keep the pots under a glass shelter with open sides throughout the season.

Observations made.

The observations made during the season were confined to the growth characters shown by the plants.

The first observations were made on April 28th and the last on November 20th, by which time all the plants were practically defoliated, the only foliage remaining being affected by frost.

On April 28th it was noted that the plants in all the series were commencing growth and there were no noticeable differences observed from the various treatments on that day.

As early as May 13th, however, the plants receiving the treatments " nitrogen omitted," " potash omitted " and " rain water only " showed differences in their foliage from the plants receiving the complete nutrient solution, the leaves of the latter plants being at that time of a healthy green colour, whilst the leaves of those receiving the " no nitrogen " treatment were pale green in colour, those of the " no potash " series were dull green in colour and stunted and those of the " rain water only " series showed reddish tints.

From this date the more important features of the observations made were as under :

1. *Growth.*—From May 13th to the middle of July the plants receiving the " potash omitted " treatment made less growth than

those of any other series. The plants remained stunted, the leaves were dull green in colour and developed patches of brown between the veins and showed a marked tendency to curl towards their under surfaces. The growth of the canes was very slender.

The growth of the plants in the series " nitrogen omitted " and " rain water only " were only slightly ahead of those of the " potash omitted " series during this period, but from July until the end of the season the " no potash " plants, although only making very poor growth, made slightly more growth than the plants of these series.

A further feature of note throughout the season was the poor growth made by the plants receiving the " calcium omitted " treatment. In previous experiments with apple trees, black currant bushes and strawberry plants, the plants receiving this treatment have made large growth—apples especially during the first season of the experiment and strawberries over the whole of an experiment which has been in progress for three years.

As in previous experiments with other plants, the plants receiving " no phosphoric acid " treatment made good growth during the season—being the first season of the experiment.

The plants of the " no magnesium " series were also behind those of the " complete nutrient " series in growth throughout the season.

Measurements of the length of canes made by the plants during the season were taken on December 21st, 1923. The data for these are given in Table IV.

TABLE IV.

GROWTH MEASUREMENTS OF RASPBERRY CANES.—SEASON 1923.

Treatment.	Complete Nutrient Solution.	Nitrogen omitted.	Potash omitted.	Phosphoric acid omitted.	Calcium omitted.	Magnesium omitted.	Rain water only.
Total number of plants per treatment	10	10	10	10	10	10	10
Total number of shoots ..	16	17	16	12	13	19	14
Total length of shoots (m.ms.)	10780	5300	6150	8006	6180	8500	3990
Average length of shoot growth per plant (m.ms)	1078.0	530.0	615.0	800.6	686.7	855.0	390.0

2. *Leaf Characters.*—The various treatments produced certain peculiarities in the foliage of the plants which, in general, were similar to those which the respective treatments have been noted to produce in experiments on other plants. These are described in detail below.

Complete Nutrient Solution Series.—The foliage of the plants in this series was normal in character, the leaflets being large, well developed and of a healthy green colour throughout the season until the time of dying down, when yellow tints were developed.

Nitrogen Omitted.—In this series the foliage was relatively scanty, the leaflets being smaller than those of the complete nutrient series. The colour of the leaflets from a very early date in the season was either yellowish green or almost white with occasional pink tints.

Potash Omitted.—Throughout the season the leaflets were small and dull green in colour and were much curled towards their under surfaces. Early in the season brown streaks appeared between the veins and from July onwards most of the leaflets developed brown marginal leaf scorch from an early stage in their development. This edge scorching was very marked by September. On September 24th it was noted that the foliage at the tips of the shoots was dying back on five of the plants.

Phosphoric Acid Omitted.—The foliage on these plants was similar to that on the plants receiving the complete nutrient solution until the beginning of September, when it commenced to develop bronzed tints which became more intense until leaf fall.

Calcium Omitted.—The foliage in this series had a somewhat unhealthy appearance throughout the season which suggested lack of vigour. The leaflets, without showing any very distinctive symptoms, were generally slightly paler in colour than were those of the series receiving the complete nutrient solution.

Magnesium Omitted.—The foliage was normal in appearance during the first half of the season, but from the end of July there was generally some yellowing of foliage observed, and during October some of the leaflets showed a definite blotching in their centres, whilst their margins remained normally green. This condition of the leaflets was not unlike that shown on the leaves of apple trees receiving similar treatment.

Rain Water Only.—The leaflets in this series were small and showed much red tinting throughout practically the whole of the season.

3. *Defoliation.*—The plants in four of the series—" rain water only," " nitrogen omitted," " phosphoric acid omitted," " magnesium omitted "—were defoliated before those of the remaining series. Some idea of the respective order in which the plants in the series became defoliated will be obtained from the following notes taken on September 30th and October 22nd, of the percentages of foliage which had fallen from the plants by these dates.

September 30th.—

Nitrogen omitted series—40% to 50% of the foliage had fallen.

Phosphoric acid omitted series—30% to 40% of the foliage had fallen.

Rain water only series—30 %to 40% of the foliage had fallen.

Magnesium omitted series—10% to 20% of the foliage had fallen.

October 22nd.—

Nitrogen omitted series—Approximately 60% of the foliage had fallen.

Rain water only series—Approximately 60% of the foliage had fallen.

Phosphoric acid omitted series—Approximately 50% of the foliage had fallen.

Magnesium omitted series—Approximately 30% of the foliage had fallen.

Other series—Less than 10% of the foliage had fallen.

Experiment on Apple Trees.—To determine the effect of altering the ratio $\frac{\text{Nitrogen}}{\text{Potash}}$ and of adding a soluble silicate to the complete nutrient solution previously used on the production of leaf scorch.

The reasons for carrying out this experiment are given at the commencement of this paper.

The variety used was Cox's Orange Pippin. The trees were planted in sand in 10in. pots on February 25th, 1921, and the method of procedure was as described for the previous experiments. Previous to planting all the trees used were root pruned according to the Stringfellow method and after planting all the shoots were pruned.

There were ten different treatments given, each treatment being given to a series consisting of five trees.

Details of the compositions of the various nutrient solutions used, together with the observations made during the season on leaf scorch and growth and foliage characters of the trees in the different series, are given below.

The series were lettered as follows and the respective nutrient solutions to be applied to these were labelled with the same letters—A, R, S, T, U, V, W, X, Y, Z.

COMPOSITION OF THE NUTRIENT SOLUTIONS.

Solution A.—This is the nutrient solution at present in use in all experiments as the " complete nutrient solution."

Sodium Nitrate	5.0 grammes
Potassium Nitrate	2.0 ,,
Di-potassium Mono Hydrogen Phosphate	1.0 ,,
Calcium Sulphate 0 H_2O	1.0 ,,
Magnesium Sulphate 7 H_2O	1.0 ,,
Sodium Chloride	1.0 ,,
Ferric Chloride	0.4 ,,
Rain Water	to 1 litre

Dilute 1 litre of solution with 9 litres of rain water for application.

Solution R.—As in solution A, but amount of nitrogen halved.

Solution S.—As in Solution A, but potassium substituted for sodium in equivalent amount.

Solution T.—As in Solution A, plus 1.0 gm. of sodium silicate.

Solution U.—As in Solution A, plus 2.0 gms. of sodium silicate.

Solution V.—As in Solution A, plus 5.0 gms. of sodium silicate.

Solution W.—As in Solution A, but amount of nitrogen halved and 1.0 gms. of sodium silicate added.

Solution X.—As in Solution A, but potassium substituted for sodium and 1.0 gms. of sodium silicate added.

Solution Y.—As in Solution A, but amount of nitrogen halved, potassium substituted for sodium and 1.0 gms. of sodium silicate added.

Solution Z.—As in Solution A, but nitrogen supply halved, potassium substituted for sodium and 5.0 gms. of sodium silicate added.

Observations on Growth Characters and Foliage.

The buds on the trees did not break much before May 13th, on which date it was noted that the leaves on some of the trees were fairly well advanced and that on the others they were still in a semi-developed condition. About that time the weather was very cold and there were several frosts, as a result of which some of the more forward foliage was damaged.

By the end of May the foliage on all the trees was well forward and looked similar in all the series. Immediately following this date the trees suffered to a certain extent from aphides' attacks, but the growth of most of the trees was not seriously affected by these. From quite an early date it was observed that the trees in all series in which the reduced nitrogen treatment and the various sodium silicate treatments were given were making less shoot growth than were those in Series A and at the end of the season the trees in these series were smaller than those in Series A. The leaves of the trees of the " half nitrogen " series were paler green in colour than were those in Series A throughout the season and showed a marked tendency to turn yellow during the season.

The silicate treatment on the other hand tended to produce leaves of a very dark green colour, especially in Series T, U, V, which leaves were of very attractive appearance during the early part of the season.

When the leaves of the trees in Series A were compared with those in Series S, X—receiving the same amount of nitrogen as in A, but extra potash—they appeared to have quite a bluish tint, the colour of those in Series S, X being a much purer green.

One further observation of interest made during the course of this experiment was that in Series S, X, Y where the solutions high in potash were used, some of the leaves of the trees developed brown patches in their centres, similar to those which were associated with deficiency of magnesium in the previous experiment on apple trees. It is intended to study this point further in 1924.

T he order ofdefoliation was determined to a large extent by the amount of leaf scorch present on the trees, as the scorched foliage generally was shed prematurely.

The trees in all series were all practically defoliated by the last week in October

Observations on Leaf Scorch.

Some idea of the manner in whch the various treatments affected the production of leaf scorch on the trees will be gained from a consideration of the following notes taken at intervals throughout the season.

Date.		*Observations on Leaf Scorch.*
July	7	None in any series.
„	16	Series T, U, V, slight scorching at tips of leaves. Remainder nil.
„	22	Series V, medium amount, Series T, U, slightly affected. Remainder nil.
„	29	Series V, fairly severe.
		Series T, U, A, slightly affected.
		Series W, one tree very slightly affected.
		Series R, S, X, Y, Z, nil.
Aug.	6	Series V, all trees very badly affected.
		Series T, U, A, scorch medium in amount.
		Series W, very slightly affected.
		Series R, S, X, Y, Z, nil.
„	11	Series V, U, very badly affected.
		Series T, A, badly affected.
		Series W, very slight.
		Series R, S, X, Y, Z, nil.
Sept.	8	Series T, U, V, very badly affected.
		Series A, badly affected.
		Series W, slightly affected.
		Series R, very slightly affected.
		Series Z, trace.
		Series S, X, Y, nil.
„	16	Series T. U. V, very badly affected.
		Series A, badly affected.
		Series R, W, slightly affected.
		Series X, trace.
		Series S, Y, Z, nil
„	24	Series A, T, U, V, very badly affected.
		Series R, W, slightly affected.
		Series Z, trace.
		Series S, X, Y. nil.
„	29	Series A, T, U, V, very badly affected.
		Series R, W, slightly affected.
		Series S, X, Y, Z, nil.

The observations made on leaf scorch after September 29th are not given above as shortly after that date a large amount of defoliation of certain of the trees took place—especially of those badly affected with leaf scorch—and hence if the condition of the foliage remaining in the different series after this date were described it would give an erroneous idea of the relative degrees of severity in the series.

The main points which are brought out by the above observations are as follows:

1.—The addition of sodium silicate in all the amounts used to the original complete nutrient Solution A produced an increased amount of leaf scorch over that produced in Series A—Solutions T, U, V—and where the highest amount was used, leaf scorch was most severe—Solution V.

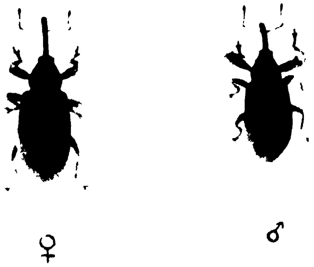

Fig. I. Adult Weevils.

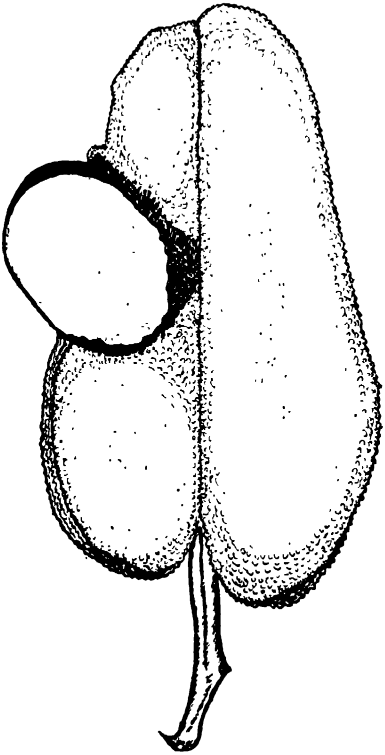

Fig II.—Egg of *Anthonomus pomorum*, *in situ* in anther lobe of apple. × 60.

The Apple Blossom Weevil (*Anthonomus pomorum*).

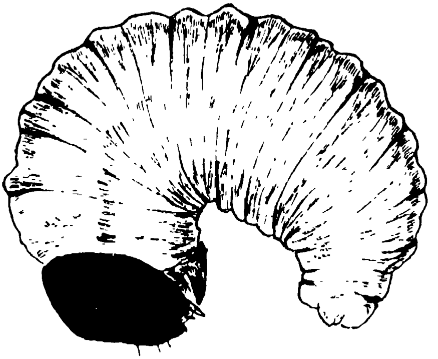

Fig. III. 1st instar larva of *Anthonomus pomorum*. Approx. × 50.

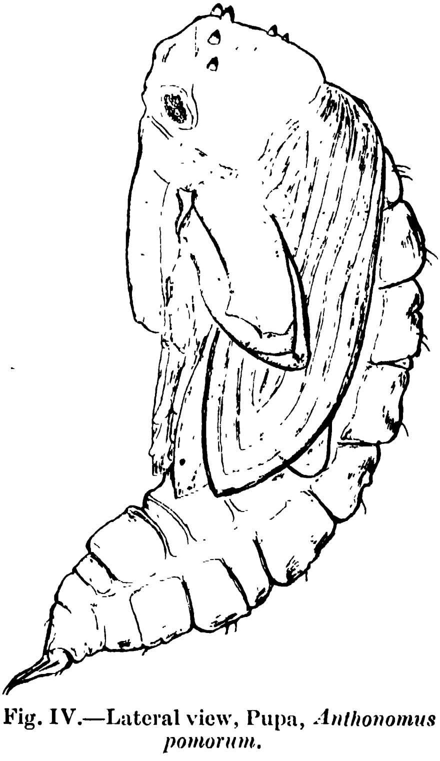

Fig. IV.—Lateral view, Pupa, *Anthonomus pomorum*.

THE APPLE BLOSSOM WEEVIL (*Anthonomus pomorum*).

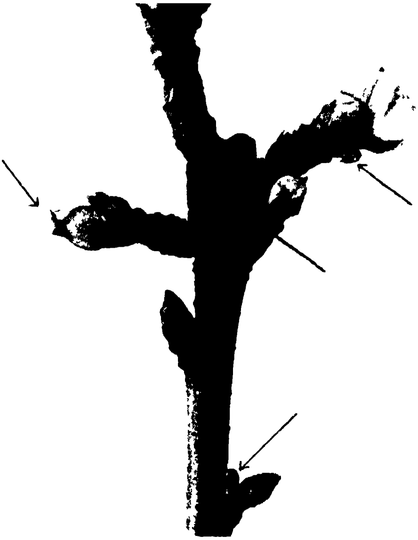

Fig. V.- See text.

Fig. VI.—See text.

THE APPLE BLOSSOM WEEVIL (*Anthonomus pomorum*).

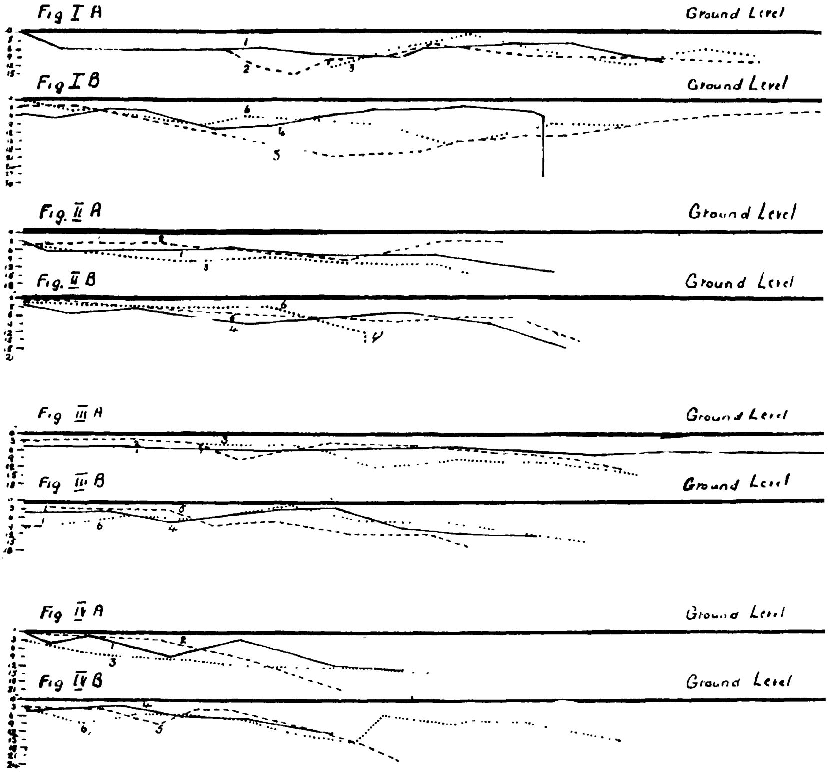

Fig. VII.—Showing depths below ground of roots.

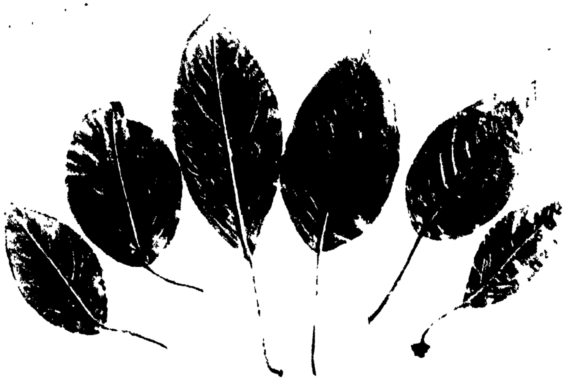

Fig. VIII.—Pear leaves attacked by the blister fungus (*Taphrina bullata*) with accompanying infection of Scab (*Venturia pirina*).

2.—Where the amount of nitrogen in the nutrient solution was reduced to one half of the amount in Solution A, the development of leaf scorch was retarded and the amount reduced below that in Series A—Solution R.

Where this reduction of nitrogen was accompanied by the addition of sodium silicate, it was still effective in reducing the amount of leaf scorch developed below that in Series A—Solution W.

3.—Increasing the amount of potash in the original nutrient solution—Solution S—was entirely effective in preventing the development of leaf scorch throughout the season—being more efficient than the reduction of the nitrogen—Solution R. This increase of the potash content was also practically efficient in controlling leaf scorch in the presence of sodium silicate—Solution X.

THE APPLE BLOSSOM WEEVIL.

(Herbert W. Miles.)

As a result of recent investigations it is apparent that local and isolated endeavours to control the Apple Blossom Weevil are not likely to yield a high degree of immunity and, since the pest is widespread and very destructive, relief should rather be sought in co-operative action. It is recommended, therefore, that growers' associations give this subject their earnest consideration with a view to encouraging in their districts the general adoption of a programme aiming at the destruction of the weevil. In order to carry out such a programme with chances of success familiarity with the habits and life history of the weevil, intimate knowledge of the control measures and their aims, and scrupulous care in carrying out these are points of paramount importance; and success will be directly proportionate to the thoroughness with which remedial treatment is conducted and the standard of hygiene maintained in the plantation.

DESCRIPTION.

(*a*) *The Adult* (Fig. 1). The Apple Blossom Weevil, *Anthonomus pomorum, L.*, is a small snout beetle; that is, a beetle characterised by the possession of a long snout or trunk, the rostrum, on which are borne the head-feelers or antennæ. The insect is black, but overlaid with ashy grey pubescence and intermingling reddish and brownish scales, the effect being a more or less greyish tone with a lighter band forming a V-shaped mark towards the apex of the wing covers or elytra. The legs are darker than the body and the femora, or thighs possess teeth, those of the anterior pair being very stout. The weevil measures from 4—5mm (2-5ths inches) in length.

(*b*) *The Egg* (Fig. 2). The eggs vary in shape from spherical to ovoid; they are whitish in colour, and they measure about .6—.7mm. along their greatest length. The outer membrane of the egg is very delicate and easily ruptured.

(*c*) *The Larva* (Fig. 3). The newly hatched larva is a soft, whitish, legless grubb, with a disproportionately large head; its body is sparesly covered with spines or bristles.

The mature larva is legless, dirty white in colour and wrinkled into numerous folds. It is sparsely clothed with bristles, which assist it in moving about. Its broadest girth is just behind the head, *i.e.*, in the thoracic region, from which point it gradually tapers off towards the caudal or tail region. There are three thoracic and nine body segments; the head is capable of partial withdrawal into the first thoracic segment. Owing to the fact that the mass of food contents of the alimentary system can be indistinctly seen through the outer skin, the larva often presents a brownish white, mottled appearance.

(*d*) *The Pupa* (Fig. 4). At the last moult of the larva the pupa is revealed. It is soft, fleshy and whitish, clothed with numerous bristles and possessing two stout caudal spines; the rostrum, antennæ, legs and wings are folded in close to the body and enveloped by a thin, transparent membrane. Later, as developmental changes go on, the membraneous wings turn smoky in colour, the eye spots become distinctly visible, and the mandibles, the tip of the rostrum, and the articulations of the limbs turn brown and, later, black. Immediately prior to the emergence of the weevil the tarsal claws and the edges of the thoracic region become darker.

LIFE HISTORY.

A brief account of the life history and habits of the weevil was given in the Annual Report for 1922, but at that time the illustrations in the insect stages and the phases of bud development of the trees were not available; since then, however, the detailed account of the work has been published (1) and some of the illustrations are reproduced here in amplification of the descriptive matter.

The weevils appear in the plantations in Spring, when the apple buds have reached the "green tip" or "delayed dormant" stage, as shown in Fig. 5; this usually occurs in March. The insects are active, particularly in bright sunshine, when they may be found piercing the buds in the process of feeding. Shortly after their first appearance, probably owing to stimulation by feeding, mating takes place, and this is followed by a period of alternate feeding and sheltering, extending until the trees have so far developed that the " cluster bud " stage is reached, that is when the young flower buds, though clustered together, stand out from the young leaves. It is at this stage, which is seen in Fig. 6, that the female weevil bores holes into the young flower bud and lays her eggs in the stamens (Fig. 2).

The young grubs feed first on the stamens and styles and later attack the petal bases and prevent the further development of the flower ; the petals, instead of opening, turn brown, wither and dry and, retaining their position, act as a dome-shaped covering over the otherwise unprotected larva and pupa. This is the " capped blossom," which is first seen when the healthy buds are in the " blossom pink " stage or are just opening. The fully fed larva pupates inside the capped blossom and in due course gives rise to the weevil which emerges and feeds for some weeks on the under surfaces of the leaves of apple, pear and plum, prior to seeking winter quarters in such sites as the rough bark of orchard and other trees in the vicinity, under the paper of old grease bands, in curled leaves either on or beneath the trees, and in cankered areas about the trees. The time for the completion of the life cycle from egg to adult varies, since it is directly dependent on the rapidity of development of the trees which, in turn, are influenced by weather conditions. Generally speaking, eggs may be found in mid-April, and young weevils may be taken during the last week of May.

CONTROL.

Though the Apple Blossom Weevil has a number of natural enemies the most important, economically, is an Ichneumon fly, *Pimpla pomorum*, Ratz. This insect has been recorded (2) as parasitising the weevil to the extent of 27.4 per cent., and in France, where the capped blossom from 800 trees was collected, 250,000 parasites were reared, then liberated, and the effect of these in checking the pest was felt for some years. In young plantations such treatment might be adopted with advantage in this country.

Various control measures have been tried from time to time, but with inconstant results ; one of these measures is jarring. It is based on the fact that when the tree or branch on which active weevils are located is struck with a padded mallet or other suitable striker the weevils fold their limbs close to the body and fall ; many may be caught if tarred sheets are prepared for their reception. Since weather conditions influence to a considerable extent the activity of the weevil, this method is not likely to be invariably successful. Bright, warm, windless days appear to be most suitable.

but one or two trees should be tried each morning from the time the weevils first appear until the flower is past; when the weevil responds the treatment might be followed throughout the plantation.

Another method, which trials at Long Ashton indicate might be successfully employed, is trapping by means of bands of brown paper or sacking once or twice folded. These bands should be in position on the trunks near the crotch by the end of March and should be examined each morning and the weevils beneath brushed off into a bucket or tray containing paraffin. This treatment, too, should be continued until the flower is past or as long as good results are obtained; its success depends on the fact that numbers of weevils seek shelter between the times of their first appearance in spring and the time for egg-laying.

When the young weevils are fully fed, usually towards the end of June, they commence seeking shelter. It is advisable to furnish them with suitable sites in the form of bands placed on the trees as before; these should be in position by the middle of June and might be examined at intervals during August, September and October, the weevils found being removed and destroyed, and, finally, in the middle of February, these bands should be taken off and burnt. The maximum benefit will be yielded by this method only if the trees are kept free from mosses, lichens, loose bark and cankered regions; it is advisable to scrape the trunks each winter and spray them with lime sulphur at least once per annum.

As previously indicated (3), the only spray which has yielded satisfactory results in destroying the weevil is an unstable paraffin emulsion applied to the sites where the weevil may be over-wintering. It is composed of:—

*Potash soft soap	0.5%
Paraffin	10%
Soft water	89.5%

This kills by contact; it should be applied in late February or early March and constantly agitated while being used.

Direct control measures only attain their maximum efficiency when hygienic conditions prevail in fruit plantations. Growers should, therefore, make a point of observing strict cleanliness about plantations, particularly as regards crop residues and the upkeep of hedges.

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*For this formula the following, in the light of recent work may be substituted.

Calcium Caseinate	1 lb.
Paraffin	10 gallons
Water	100 gallons

The effect is the same but the latter spray eliminates all complications due to hardness of water.

The following programme of operations is suggested as offering the maximum immunity from the depredations of the Apple Blossom Weevil :

1.—Scraping the trunks of old orchard trees in February and applying the emulsion herein recommended.

2.—Spraying with Lime Sulphur 1—20, in the " delayed dormant" stage.

3.—Banding from the middle of March to the end of April.

4.—Collection of capped blossom during the first fortnight of May.

5.—Banding from mid-June onwards.

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*DATA ON THE LATERAL SPREAD OF THE ROOTS OF FRUIT TREES.**

(*G. S. Peren.*)

The distance apart at which trees of the different fruits should be planted in the orchard is a subject of great importance to the commercial grower and one on which decisions must be greatly helped by a knowledge of the lateral spread of the roots of fruit trees. The policy of interplanting with " filler " trees or bush fruits, and the length of time which these may be allowed to remain without seriously competing with the permanent trees, should be guided by a knowledge of the rate of lateral spread and depth below ground level of the major portion of root systeme. Unfortunately the importance of the last two factors is not appreciated to the same extent in this country as in most of the big fruit growing centres abroad, with serious results in many cases both to the growth of the trees and evenness in the size of their fruit.

In addition, this subject is extremely important at a Research Station, where it is often essential that trees under treatment shall be free from competition with the roots of surrounding trees.

For the above reasons it was therefore decided to make examinations of the roots of trees of the different orchard fruits as material became available, noting the length of the main roots and their depths below ground level.

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The initial work was commenced in 1921. Although the material then available was not in all cases satisfactory, yet it was felt that it might prove of value in determining the best method of carrying out the work.

The results for that year, which were published in the Report of this Station for 1921, may be briefly summarised as follows :—

Example I.—Norwegian Cherry, standard tree, 15 years from bud. Lateral spread of roots approximately 30′.

Example II.—Apple, Bramley's Seedling, bush tree, 19 years old. Lateral spread of roots ,approximately 10′ 6″. Note : This tree had been transplanted when nine years old.

Examples III.—Apple, King of the Pippins, bush tree, 19 years old. Spread of one root examined, 10′ 4″. An extremely poor tree and so figures are probably sub-normal for a tree of this age.

Example IV.—Apple, King of the Pippins, bush tree, 19 years of age. Spread of one root examined, 8′ (total length, 13′ 2″).

Examples V., VI. and VII.—Plums, Pond's Seedling, Victoria, Early Transparent Gage, bush trees, 16 years old. Lateral spread of roots examined approximately 9′ 6″, with one exception of 12′ 8″.

Example VIII.—Plum, Early Transparent Gage, bush tree, 16 years of age. Lateral spread of root examined 4′ 8″. A very poor tree, considerably below normal.

Example IX.—Broadleaved Paradise Stock, one year's growth after removal from parent stool. Length of longest root 22″.

Example X.—Apple, Stirling Castle, three bush trees, 4 years old (two years in site). Lengths of longest roots : Tree (*a*) 5′ 9″ ; (*b*) 4′ 9″ ; (*c*) 4′ 6″.

Example XI.—Apple, Allington Pippin, five bush trees, three years old (two years in site). Lengths of longest roots : Tree (*a*) 4′ 3″ ; (*b*) 4′ 8″ ; (*c*) 4′ 10″ ; (*d*) 5′ 3″ ; (*e*) 7′ 1″.

The 1921 Report contains observations on the extent and character of the growth of the root systems of the aforementioned trees. Further data have been collected as opportunity offered and are summarised in the present article.

The method of examination adopted for 1922–23 has been to select at least the six largest roots and to follow them from their point of origin at the trunk to their apices, making at the same time notes on any variations in their depths below ground level.

The available materials consisted of apple trees of cider varieties, 16 years of age from the bud, which had been growing as standard trees in a grass orchard for the last 12 years.

This orchard has been heavily stocked for a great many years, and during the last four seasons has been used for raising pigs on the " out-of-doors " system.

The trees, which were approximately one-third the size of mature trees, were in excellent condition, and in this respect may be considered normal material.

The stocks concerned were " free " stocks, and exhibited to some extent the variations in type of growth which exist even among the strong " free " stocks.

Owing to lack of space available, detailed tables of the measurements taken are omitted. The measurements from the apices of the roots in direct lines to the points where the roots arose from the trunks have been included in order to give a more accurate picture of the radius of root spread.

The depths of many lesser roots were taken at a distance of 3′ 6″ from the trunks, and with the exception of Example No. IV., the trunks of all the more important roots were traced and measured. Owing, however, to lack of space, the former are omitted, since few of them vary to any great extent from the larger roots, and only six typical large roots of each tree examined are shown in Fig. 7.

Tracing was not continued once a root was found to be striking downwards vertically on account of the large amount of labour required.

Example I.—Variety, Eggleton Styre. Length of roots :—

(1) Fig. 1A, actual length, 20′ 5″ ; apex of root from trunk, 18′. This root extended into a portion of the orchard which was ploughed in the Spring of 1922, and was cut off by the plough when 7 16″ in diameter. The detached portion could not be traced and so the figures given do not represent the full length of the root.

(2) Fig. 1A, actual length, 23′ 4″ ; apex of root from trunk, 20′ 8″.

(3) Fig. 1A, actual length 23′ 5″ ; apex of root from trunk, 22′ 6″.

This root when ¼ inch in diameter had been cut by the plough as in the case of (1).

(4) Fig. 1B, actual length, 19′ 2″ ; apex of root from trunk, 14′ 10″.

(5) Fig. 1B, actual length, 25′ 4½″; apex of root from trunk, 20′ 2″.

(6) Fig. 1B, actual length, 18′ 5″; apex of root from trunk, 15′ 1″.

Root struck vertically downwards and at a depth of 28″ was ¼ inch in diameter.

As will be seen from the diagrams, the trunks of the main roots are in this case contained within the top 20″ of soil. Detailed measurements were taken of all other important roots, but no marked variation was found.

Taking into account the fine terminal sections of the roots, which it is almost impossible to trace, the average radius of the root spread of this tree would appear to be approximately 20″.

Example II.—Variety, Sweet Alford. Length of roots :—

(1) Fig. 2A, actual length, 16′ 11″; apex of root from trunk, 15′ 11″. Root struck down vertically when ⅛″ in diameter.

(2) Fig. 2A, actual length, 15′ 3″; apex of root from trunk, 14′ 8″. This root when 3/16″ in diameter had been recently broken by pigs. Measurements could not be taken beyond this point.

(3) Fig. 2A, actual length, 14′ 6″; apex of root from trunk, 13′ 8″. Root struck downwards vertically when ⅛″ in diameter.

(4) Fig. 2B, actual length 17′ 6″; apex of root from trunk 16′ 9″. Root struck downwards vertically when 3/16″ in diameter.

(5) Fig. 2B, actual length, 11′ 3″; apex of root from trunk, 10′ 4″. Generally speaking this tree was shallow rooted as the term is usually understood.

Only a few small roots struck downwards from under the tree. The average radius of root spread would appear to be about 15′.

Example III.—Variety, Royal Jersey. Length of roots :—

(1) Fig. 3A, actual length 25′ 10″; apex of root from trunk, 24′ 4″.

(2) Fig. 3A, actual length 19′ ½″; apex of root from trunk, 17′ 8″. Root struck downwards vertically when 3/16″ in diameter.

(3) Fig. 3A, actual length, 20′ ½″ ; apex of root from trunk, 12′ 8″. Root struck downwards vertically when 3/16″ in diameter.

(4) Fig. 3B, actual length, 17′ 11″ ; apex of root from trunk, 15′ 5″. Root struck downwards vertically when ⅛″ in diameter.

(5) Fig. 3B, actual length, 14′ 9″ ; apex of root from trunk, 13′ 11″. Root struck downwards vertically when 3/16″ in diameter.

(6) Fig. 3B, actual length, 16′ 3½″ ; apex of root from trunk, 15′ 1″.

It will be seen by reference to Fig. 3A and Fig. 3B that this stock was extremely surface rooting, some of the roots running for considerable distances within a few inches of the surface and well within the zone of the roots of the grass.

The absence of roots arising immediately under the tree was most marked.

The radius of root spread is again about 15′.

Example IV.—Variety, Knotted Kernel. Length of roots :—

(1) Fig. 4A, actual length, 11′ 10″ 0 apex of root from trunk, 10′ 3″. Root struck downwards vertically ⅛″ in diameter.

(2) Fig. 4A, actual length, 10′ 1″ : apex of root from trunk, 8′ 6″. Root struck downwards vertically when ¼″ in diameter.

(3) Fig. 4B, actual length, 13′ 8½″ : apex of root from trunk, 11′ 9″.

(4) Fig. 4B, actual length, 9′ 7½″ ; apex of root from trunk. 9′ 3″. Root struck downwards vertically when ¼″ in diameter.

(5) Fig. 4B, actual length, 11′ 6½″ ; apex of root from trunk, 10′ 11″. Root struck downwards vertically when 1/6″ in diameter.

(6) Fig. 4B, actual length, 19′ 3″ ; apex of root from trunk, 19′.

The stock of this example was distinctly " fangy " and deeper rooting than the other three examined. A number of roots of equal size to those traced, struck down from the trunk at an almost vertical angle and could not be followed owing to the large amount of labour necessary.

The " break " of the new roots after planting in the orchard was quite distinct, large numbers of strong roots having arisen from the ends of the original " fangy " roots which had necessarily been heavily pruned when the tree was lifted in the nursery. This dissipation of the growth of the root system appeared to account for the shorter average root in this example and the roots, which had arisen on the inner sides of the old " fangs," tended to continue downwards at steep angles as already stated.

It may be mentioned as a point of interest, that this variety, which makes a strong and very upright tree, has the reputation amongst nursery hands of inducing very deep-rooting by the stock. Being a cider variety, it is, incidentally, always " worked " on untyped " free " stocks.

In this example probably not more than 50 per cent. of the large roots were contained in the first 20″ of soil.

The radius of root spread is in this case only some 10′.

A noteworthy feature of the observations here recorded, as in those of 1921, has been the frequency of occurrence of roots which, after pursuing a more or less horizontal course for some distance, suddenly dip in a practically vertical direction and penetrate to a considerable depth. Such cases have been noted in root systems of widely differing ages, some indeed only three years old. The character of the soil at the point where the abrupt change in direction occurs presents no obvious feature to account for this behaviour, and it may be stated with certainty that it is not associated with the striking of any actual cleft or lighter vein. Appearances suggest that these downward striking roots are the true terminals of extension growths of the root system. As terminals they seem to be positively geotropic and the vertical habit results, and on reaching depths at which conditions for free root growth are less favourable, their rate of growth is checked and the laterals immediately behind, which are growing in a more or less horizontal direction, are accordingly stimulated to greater activity and become in effect leaders, for the time being continuing their horizontal course. In turn the latter may ultimately strike downwards and in this way a succession of extension growth in either direction is produced, the horizontally placed being usually the more vigorous by reason of the more favourable conditions. What determines the sudden change from the horizontal to the vertical course can only be surmised on the evidence at present available; it may, from indications observed, synchronise with the beginning or end of each growing season.

It is interesting to note that under the prevailing local conditions the roots of "free" stocks frequently penetrated the upper 6″ of soil which contained a mass of grass roots. The grass, as already previously mentioned, has always been heavily stocked.

Summary.

From the results of even the relatively small number of root systems examined during the last two years it is evident that in the case of healthy material there must be considerable overlapping of the root systems of permanent trees at the distances at which a large percentage of both bush and standard trees are planted in this country. While in the absence of definite evidence showing the extent of the effect of such over-lapping no quantitative statement can be made, it is hardly to be doubted that the check to growth must in many cases be severe.

The cherry, plums, and apples on Paradise stocks examined in 1921, and with one exception, the apples on "free" stocks examined in 1922, appear to confine the major portion of their root systems to at least the first two feet of soil. This may be due in part to the humid climate of this locality and to the presence of a heavy, poorly aerated subsoil, but other investigations already cited have found that the feeding roots of the bulk of apple trees are much nearer to the surface than has been generally supposed..

When the observations recorded in the two preceding paragraphs are considered in conjunction, some idea may be gained of the congestion of feeding roots which must exist where an orchard of large trees is planted up with soft fruit and the severe competition which must follow when "filler" trees are left in too long.

Considerably more data must be collected before the economic aspect of these observations can be profitably discussed. It is intended to examine during the coming year a number of vigorous young trees on Paradise root stocks.

PROGRESS REPORT ON BIG BUD AND REVERSION OF BLACK CURRANTS.

(*A. H. Lees.*)

In the winter of 1920 545 black currant bushes were planted at Long Ashton for the purpose of investigating Big Bud and Reversion diseases in the field.

Sufficient time has now elapsed to get some indication of the increase or otherwise of these diseases. The writer, however, would very urgently point out that general conclusions must not and cannot yet be drawn since the plantation is as yet relatively young and its subsequent behaviour may not be similar to its behaviour so far.

The plantation consists of four varieties according to Hatton's chief groups: Victoria, Boskoop, French and Baldwin. The varieties at Long Ashton are Edina, 115 bushes; Boskoop Giant, 123; Seabrook's Black, 134; Baldwin (Strain I), 57; Baldwin (Strain II), 118. Strain I was obtained from Herefordshire; Strain II from Kent.

Each winter every bush has been marked for presence of Big Bud and each summer for the presence of Reversion. There have thus been so far four markings for the former and three for the latter. The results for numbers are given in Table I., and for percentages in Table II.

TABLE I.

Variety.	Reverts. Year.			Revert Rcovries. Year.		New Reverts. Year.		Big Bud. Year				Big Bud Recoveries. Year.			New Big Buds. Year.		
	1	2	3	2	3	2	3	1	2	3	4	2	3	4	2	3	4
Edina ..	23	26	25	1	1	4	0	81	21	30	40	65	11	7	5	20	17
Boskoop Giant ..	5	6	7	0	0	1	1	2	1	3	8	1	0	0	0	2	5
Seabrook's Black ..	6	8	10	1	0	3	2	0	0	0	5	0	0	0	0	0	5
Baldwin I	0	0	1	0	0	0	1	0	1	2	12	0	1	2	1	2	12
Baldwin I	4	7	7	0	0	3	0	2	3	9	34	1	0	1	2	6	26
TOTAL ..	38	47	50	2	1	11	4	85	26	44	99	67	12	10	8	30	65

TABLE II.

Variety.	New Reverts Year.			Total Big Budded. Year.				New Big Budded. Year.			
	1	2	3	1	2	3	4	1	2	3	4
Edina ..	20	3.5	0	70	18	26	35	70	4.3	17.4	14.8
Boskoop Giant	4.1	8	.8	1.6	.8	2.4	6.4	1.6	0	1.6	4.0
Seabrook's Black ..	4.5	2.2	1.5	0	0	0	3.7	0	0	0	3.7
Baldwin I	0	0	1.8	0	1.8	3.6	21	0	1.8	3.6	21
Baldwin II	3.4	2.5	0	1.7	2.5	7.6	29	1.7	1.7	5.1	22
TOTAL ..	6.9	2	.7	15.6	4.8	8.1	18.2	15.6	1.5	5.5	12

In Table I., Column 2, contains the total number of reverted bushes in each year, Column 3 the number recovering each year, Column 4 the number of new reverts (not counting old ones therefore) each year. Column 5 contains total big-budded bushes for each year, Column 6 the recoveries, and Column 7 the new big-budded bushes each year.

These results are brought into truer perspective in Table II., where the more important figures are expressed in percentages. Considering Reversion first, this table shows that the varieties were very differently infected when obtained from the raiser. Thus Edinas contained 20 per cent. reverts the first summer; Boskoop, Seabrook and Baldwin II, about 4 per cent.; and Baldwin I, 0 per cent. It is clear, therefore, that to the grower the source from which he obtains his bushes is of prime importance. In the second year the number of fresh reverts shows a considerable drop, the totals falling from 6.9 per cent. to 2 per cent., and the individual varieties falling where possible, in varying degrees. The third year shows a further drop for the totals to .7 per cent., only one variety showing a rise, representing actually one bush only. There has, therefore, been a continuous drop in fresh infections, if fresh infections they really are, even the highly infected Edinas showing no new case in the third year.

In the ordinary course of events reverted bushes should be removed from a plantation and it is for this reason that percentage figures for new cases and not for totals present have been considered. In this plantation this roguing has not been done in order to give a source of infection if possible. Despite this the new infections have decreased from year to year and there is no evidence to show that old bushes act as sources of infection.

If proper roguing had taken place and one were to imagine an acre of such bushes set 6ft. by 6ft. then, in the first year out of 1,210 bushes 83 bushes would have been revert, in the second year 24, and in the third year only 8. The plantation is, however, as yet young, and there is no guarantee that its future behaviour will be the same as its past.

Considering now the figures for Big Bud infection, Edinas arrived from the raiser with 70 per cent. of the bushes infected: Boskoop and Baldwin II, with about 2 per cent., and Seabrook's Black and Baldwin I, with 0 per cent.

The Edinas were, of course, not fit to plant commercially and should, in ordinary commercial practice, have been returned to the vendor. In this case, however, it appeared a good opportunity for testing treatment. Every big bud was most carefully removed with the result that in the second winter only 18 per cent. instead of 70 per cent. were infected and those only very lightly. The

18 per cent. second year infects were not confined to bushes infected in the first year, but were equally distributed over all the bushes of the variety whether originally infected or free. No further big buds were removed except in the ordinary course of pruning and the variety showed further increases in numbers of infected bushes in the third and fourth years.

Boskoop Giant has shown a slow increase of infection and thus, up to the present, has shown itself somewhat resistant.

Seabrook's Black has justified its introducer's claim for high resistance to Big Bud. No claim for immunity has ever been advanced by its introducer and the distinction between the two terms should be clearly recognised.

So far all the big-budded Seabrooks are reverts, though the exact connection between the two diseases is not yet clear. Considering this variety alone one might say that only reverted bushes get Big Bud, but in other varieties this is not the case. Both Baldwin strains started with a low percentage infection of Big Bud. By the fourth year, however, they are relatively high. It is clear that the green budded varieties, Edina and Baldwin, are far more susceptible than the red budded Boskoop and Seabrook. This fact is, of course, already known, but the figures in Table II. serve as additional evidence.

The totals for big-budded bushes show a considerable drop in the second year, due to removal of big buds, followed by a rise up to the fourth year when the first year's figure is somewhat exceeded. Practically all these big-budded bushes are only slightly affected and such bushes, where not reverted, seem to bear a normal crop. Thus so far the only crop-inhibiting factor that appears to be acting is Reversion.

CONCLUSIONS.

Up to the present, and without prejudice to the future of the plantation, the following conclusions may be drawn from this investigation :—

As regards Reversion :—

(1) The number of new infections has decreased each year.

(2) There is no evidence to show that reverted bushes act as sources of infection.

As regards Big Bud :—

(3) A rigorous removal of Big Buds in the winter considerably reduces the infection the following year, even with bad cases.

(4) Mildly attacked bushes show no appreciable reduction of crop.

THE STRUCTURE OF REVERTED BLACK CURRANTS.

(*Winifred F. F. Ridler.*)

In the Annals of Applied Biology, Vol. IX., 1922, Mr. A. H. Lees described a method for identifying cases of Reversion in Black Currants by means of certain morphological characteristics on the leaf, and the nature of the leaf margin the number of sub-main veins running from the mid-rib to points in the margin, and the number of margin points being numerically fewer in reverted leaves than in normal ones.

The object of the present investigation was to ascertain if there were any anatomical differences between reverted and normal plants, and if so, whether such differences could be correlated with the morphological evidences of the disease.

For this purpose a large number of normal and reverted plants grown at Long Ashton, namely, Edina, Seabrook's Black, Boskoop Giant and Baldwin, though Boskoop Giant was examined in most detail. Sections were cut from every part of the plant.

In the root, stem, leaf stalk, leaf, inflorescence stalk, and flower stalk the differences are of the same type in all. In all cases the main differences seem to lie in the tissues of the wood and bast, the structure of the cortex and pith being apparently the same in both normal and reverted plants. The wood cells throughout reverted plants are smaller than in the normal, while the cells between them (medullary ray cells) are larger in the revert than in the normal. This is shown in the following table of measurements, the figures given being the diameter of the cells in μ.

	NORMAL.		REVERT.	
	Wood.	Med. Ray Cells.	Wood.	Med. Ray Cells.
Root	7—50μ	3·5—9μ	5—45μ	3·5—14μ
Stem	18—36μ	—	14·5—39μ	—
Petiole	20—25μ	3·5—9μ	15—29μ	3·5—10μ
Leaf	15—45μ	2·5—6μ	12—35μ	3·5—7·5μ
Peduncle	3·5—18μ	—	3·5—10·5μ	—

The area of the woody tissue, therefore, as compared with the area of the medullary ray tissue, is smaller in the reverted plant than in the normal. The arrangement of the cells in these two tissues is also less regular in the revert, and the cells themselves have less definite contours. There is one other difference which is shown to the greatest extent in the leaf-stalk. In reverted plants a gummy substance is produced which may completely block some of the wood cells or entirely destroy them. This gum may also occur in certain cells of the bast. It is produced also in normal plants, but not to so large an extent.

The fruits of black currant plants suffering from Reversion, either do not form at all, the flowers themselves shrivelling up and dropping off, or the fruits may begin to form, in which case, development is soon arrested and the half-formed berries shrivell and fall.

Sections through a normal unripe fruit show a large well-developed and profusely branched conducting system. The ovary is large and well-developed and the ovules are normal and healthy, showing reproductive nuclei. In the reverted plant where formation of the fruit has begun, the internal condition as shown by sections, is very different. The conducting system is reduced and not so profusely branched. The ovary is small and poorly developed, and the ovules reduced in size and hypertrophied, no reproductive nuclei being formed.

In some cases, where the fruit has not even begun to form, and the whole flower has dropped off, sections show that the conducting system is still more reduced and may even be absent altogether. An enormous amount of the gummy substance described as occurring in the petiole, may be produced at the base of the ovary, in some cases completely blocking all the tissues. The ovary is very reduced in size, and the ovules are aborted. The stamens are hypertrophied and the pollen grains arrested in development.

Briefly, the main differences showing to a greater or lesser extent all through the plant are, a reduction in the amount of wood, and a consequent increase in medullary ray tissue, coupled with a tendency to produce more gum in the reverted plant than in the normal.

On the whole it is very difficult to correlate the morphological evidences of the disease with any of the anatomical differences observed, as the latter seem quite inadequate to account for the comparatively large morphological effect.

*EGG KILLING WASHES.**

(A. H. Lees.)

The experiments described below are a continuation of work done during the Winter of 1922 and published in the Annual Report for 1923. This work showed that certain substances were capable of reducing the hatch of Aphis pomi (Permanent Apple Aphis) to under 1% against control hatches of 2.4, 7.2, 17.5 and 25.3. While the figures for hatching of controls were too variable to be satisfactory there was clear evidence that in these experiments lime-sulphur and some coal tar products had very marked killing action.

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* Reprinted from The Journal of Pomology and Horticultural Science, Vol. III, No. 4.

The trials were, therefore, continued in the winter of 1923 and a special attempt was made to eliminate some of the probable sources of error.

Procedure.

The eggs selected for the trials were those of the Permanent Apple Aphis, A. pomi. These eggs can be obtained generally in large quantities and the young trees, mostly maidens or two-year-olds were grown in pots. This method enabled the trials to be carried out under conditions approaching as far as possible to natural conditions in the field.

Each fluid to be tested was sprayed, not painted as in 1922, on to a single long twig covered with eggs. Untreated twigs were left occasionally as checks. Care was taken that no spray fluid reached any neighbouring twigs on a tree that were to be tested with a different fluid.

In 1922 some of the controls and treated portions showed an unexpectedly low hatch and it appeared probable that this was due to the fact that such eggs were exposed to a laboratory temperature for two or three hours. It has been shown that aphis eggs, if subjected to room temperature in winter are very apt to die. To avoid this possibility, therefore, the trees were sprayed outside in fine weather or in a cold greenhouse if wet weather. They were not exposed to rain and weather until the spray fluid was dry, but after this was accomplished they were placed in an unsheltered position.

As soon as hatching began the trees were removed inside and laid over oiled paper. The young larvæ on emerging from the egg seem to find considerable difficulty in preserving a foothold and usually fall on to the paper. In this position they can be counted at leisure. After hatching was finished and all counts made the twigs were cut into sections and the empty egg shells and unhatched eggs separated by hot caustic soda. The number for each treatment was then estimated by counting six separate aliquot portions.

Results.

Controls.—The percentage of hatch for the six controls used during the whole experiment were 15, 26, 26, 30, 46, 43, or an average figure of 30.5. These figures are much higher than those obtained in 1922 and point to the probability of the experiment being done under more natural conditions. No doubt a certain number of larvæ were lost before the trees were removed inside for counting. It was unfortunately impossible to find sufficient room under cover and under proper conditions to make the move early enough to preclude this possibility.

For convenience of consideration the various substances tried may be divided into a few groups.

The first group consists of various sulphur bodies of which lime-sulphur is the most important.

TABLE I.

SULPHUR GROUP.

% hatch.

Lime Sulphur	Alone.		With ·2% Calcium caseinate.	
	Applied Feb. 20th	Applied Mar. 19th	Applied Feb. 20th	Applied Mar. 19th
1 in 15	7	7	·07	·55
1 in 20	3	9	·5	·7
1 in 30	12	0	·55	·9
1 in 60	20		20·0	
Sulphur fumigation	26			
Sulphaqua 1 in 500 ..	8			
	13			
1 in 1 000 ..	43			
Hypo 5%	29			
Hypo and HCl ..	18			
Sulphur paste ..	15			

The lowest number of eggs used in the lime-sulphur treatments was 246, the highest 4,666 and the average 2,059.

The figures for lime-sulphur applied alone at all strengths and times are comparatively high. It may be taken that unless a fluid gives a percentage hatch of below one it has but little value for commercial purposes. The rate of multiplication of aphids is so high that any figure higher than one would give in practice but a poor control. In the 1922 results figures below 1% hatch were obtained but the 1923 figures are more in accord with the frequent unreliability of lime-sulphur for egg killing purposes which has been the experience of commercial growers. There are two possible reasons for the discrepancy between the 1922 and 1923 figures. The first is that the 1923 controls gave a higher hatching figure, which suggests that in 1922 there may have been some other anti-hatch factor present beside the wash used. The second and probably more important reason is the different method of application. In 1922 the lime-sulphur was brushed on, in 1923 it was sprayed on. Lime-sulphur has rather poor wetting powers and the extra contact made by brushing over spraying may serve to explain the difference obtained in the two years. That this explanation is probably correct is indicated by the figures given for the various strengths of lime-sulphur when used with the addition of .2% Calcium caseinate. Calcium caseinate increases the spreading power and probably the wetting power and a very marked change in the percentage hatch figures are shown.

With the exception of the strength 1 in 60 all strengths tried show a hatch of under 1%. On the whole the higher strengths show slight superiority and the same applies to the earlier date. Those differences though consistent are not of such magnitude that undue stress should be laid on them. The chief point brought out is the very large difference made by the additions of Calcium caseinate. It would thus appear that a higher strength than 1 in 30 is unnecessary and should this result be confirmed by further trials it would appear that lime-sulphur could be used as a cheap and reliable aphis egg killing wash for winter work.

The lower part of Table I shows the effect of various other sulphur containing fluids. Fumigation by sulphur vapour had no appreciable effect. Sulphaqua, a proprietary body giving off sulphur dioxide and finely divided sulphur, had a slight effect at the higher strength and so possibly had sulphur paste and hypo and hydrochloric acid. On the whole. however, there was nothing to indicate that either finely divided sulphur of sulphur dioxide had any appreciable effect. This fact seems to suggest therefore that the action of lime-sulphur must be looked for in its polysulphide content.

TABLE II.

NICOTINE SODA GROUP.

% hatch.

Caustic Soda. %	Nicotine. %	Feb. 20th.	Mar. 10th.
2	·05	3	0
2	·025	4	·05
2	·012	22	
1	·1		0
1	·05	17	
1	·025	21	·16
1	·012		·54
	·05	22	11·0
	·025		27·0
	·012	44	13·0

The lowest number of eggs used per treatment was 120, the highest 5,533, and the average 1,919.

The original idea in testing mixtures of caustic soda and nicotine was that the action of the soda might prepare the way for the entry of the nicotine. It was not probable that either substance by itself was likely to be effective but the combination might. The 1922 results were inconclusive but suggested that there might be some action.

Table II shows that for the February date and for most of the strengths tried the mixtures were useless. Two per cent. soda combined with .05% and .025% of nicotine did, however, considerably reduce the hatch. For the March date all combinations of soda and nicotine caused marked reduction of hatch bringing it below 1%. In all these cases a slight damage to the terminal bud was caused owing to the fact that it was already swelling. No permanent damage was done however. Nicotine by itself without soda proved ineffective at all strengths though slightly more killing than when tried in February. The addition of caustic soda considerably increased killing power, as may be seen by comparison of different strengths of nicotine in the February treatments. Thus for strength .012 nicotine no soda gave 44% hatch, 2% gave 22%. For .025% nicotine 1% soda gave 2.1% hatch, 2% gave 4% hatch. For .05% nicotine 1% soda gave 17% hatch, 2% soda gave 3% hatch. From these facts it is clear that caustic soda nicotine might have a commercial use under certain circumstances. Thus, when an orchard is especially overgrown with epiphytes or mussel scale has to be dealt with, by delaying the spraying as late as possible and adding .025% of nicotine an ordinary caustic soda spraying might be made very much more effective against insect eggs.

TABLE III.

COAL TAR GROUP.

% hatch.

% Strength.	10	7	5	4	3½	2½	2	1
Substance								
A	1·4	7		52				23
B	5	6		15				22
C	5	5		22				15
D	·06	·3		8				38
E	6	5		27				31
F				30			31	49
G			·39		·9	·38		
H	18		26			10		

The lowest number of eggs used per treatment was 230, the highest 4,850 and the average 1,361.

In the above Table A—D are portions of a gas works distillate boiling between certain temperatures. These portions were combined with soap to form emulsions and tested at the strengths shown in the table. The only fractions showing any marked killing power are 10% of A, and 10% and 7% of D. It is hoped to follow up the indications given by these figures in future trials.

E and F were proprietory preparations and the figures given call for no comment.

G was an artificial product made up from a well known coal tar derivative and gave very satisfactory results. No injury resulted to the plant from the use of G.

H is another tar derivative, which not only gave a very high percentage hatch, but also killed all the treated plants.

It is clear from these figures that coal tar derivatives derived from gas works products only give very variable results. Many substances have no useful action, some are directly dangerous and some appear to be very useful. The trials are yet at too early a stage to allow of any definite conclusions being drawn, but the fact that one body has been found which gives a strong killing effect without damaging the plant, suggests that finally some fluid fit for commercial purposes may ultimately be found.

Conclusions.

Working with the eggs of Aphis pomi it was found that :—

(1) Lime-sulphur at all strengths by itself was effective.

(2) Lime-sulphur with the addition of .2% calcium caseinate had a strong killing action at the strengths of 1 in 15, 1 in 20, and 1 in 30, whether applied in February or March.

(3) Other fluids releasing or containing finely divided sulphur or sulphur dioxide were comparatively ineffective.

(4) Combinations of caustic soda and nicotine had strong killing power if applied just before hatching but were useless at an earlier date.

(5) Certain of the coal tar products were very toxic, but most of them were inoperative and some damaging to the plant.

*A NOTE ON THE EFFECT OF SULPHUR ON BLACK CURRANT MITE.**

(*A. H. Lees.*)

In the Annual Report for 1919 reference is made to the effects of lime-sulphur spraying on control of Big Bud. This treatment has sometimes been promising and sometimes disappointing. It seemed necessary, therefore, to investigate more closely the action of sulphur on the migrating mites. Lime-sulphur itself is a compound body. It contains polysulphides which, when sprayed on to a plant, deposit a coat of sulphur, at the same time giving off sulphuretted hydrogen. The evolution of this gas lasts, however, for probably a short time only and any continued toxicity of the spray depends most likely on the action of the sulphur itself.

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* Reprinted from the Journal of Pomology and Horticultural Science, Vol. III, No. 2.

In order to be quite certain of the action of sulphur by itself, it was necessary to use it in the pure form and this was done by obtaining a sulphur cloud by means of an air current over the heated substance.* This cloud was projected into a closed glass bell jar and left for three days to allow the coarser particles to settle. The sides of the jar were thus covered with an invisible coating of sulphur.

A black currant twig, with some big buds on it, was placed with its lower end in water inside the jar. The jar was closed at the bottom by the bench of the laboratory, but had a small opening at the top. The experiment was done in spring, just when mite-migration was beginning, at a temperature that encouraged it,

The following details show the result of the experiment. 1st day—twig placed inside. 5th day—Heavy migration. Very few living and those just emerged. Some on stem of bud, but dead. Most at bud mouth opening. 7th day—ditto. 10th day—ditto, but few living. A few on stem of bud, but dead. 16th day—ditto. 24th day—All dried up and brown.

Under these conditions, therefore, there was a very decided killing effect, which lasted at least 16 days, even though air diffiusion could take place to some extent through the slightly open top.

A similar experiment was done using a deposit of lime-sulphur on the inside of the bell jar. This deposit was well washed with water and dried before use to obviate any danger of the presence of sulphuretted hydrogen. 1st day--Twig placed in bell jar. 7th day—Mites emerging, but all killed. 11th day—Many mites emerged, a few living. None on stem. 13th day—ditto. Isolated mites on stem. 16th day—ditto, but more living. Fair numbers on stem, some living. Migration evidently proceeding, though slowly. 22nd day—ditto. 30th day—All dried up and brown.

The effect seemed to be the same as with pure sulphur, but it did not last quite so long.

A third big-budded twig was treated in a different way. It was held for a few seconds in the path of a sulphur cloud so as to be covered with minute sulphur particles. It was then placed in a moist closed bell jar. 1st day—Twig placed in bell jar. 7th day—Mites emerging, but killed. 11th day—Many mites. One or two (newly emerged) living, a few on stems dead. 13th day—ditto. 16th day—ditto, but rather more living, especially at opening of bud. Some living on stem of bud. 22nd day—Most dead and dried up.

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* Barker and Wallace. A New Method of Sulphur Fumigation. 1921. Annual Report, Long Ashton Agricultural amd Horticultural Research Station.

This method, therefore, gave about the same control.

The following give the details for an untreated big-budded shoot kept in a closed bell jar. 1st day—Twig placed in bell jar. 5th day—Active, living. 7th day—ditto. All over the stem. 10th day—ditto. 16th day—ditto. 24th day—Still active, but only a few emerging.

There was, therefore, no interference with normal migration by keeping the mites in the close atmosphere of a bell jar. It was, indeed, necessary to keep them in a rather moist atmosphere as they are very liable to dessication in the laboratory.

Under indoor conditions, therefore, the migration went on for about three weeks, during which time all the sulphur treatments exercised general control. The influence of the lime-sulphur treatment seemed to be weak after the first fortnight, and the same applies to a lesser degree to the twig exposed to the sulphur cloud. Probably the supply of sulphur present was becoming exhausted.

These experiments clearly show the great value of sulphur in controlling mites and its effect seems to be very deadly. Its action, however, is limited by its comparatively short duration. In the field mite-migration may be proceeding for two and a half to three months, so a second or third application would appear to be necessary. If lime-sulphur is used, a second or third application must be at summer strength, since foliage has reached a fairly advanced stage, and consequently far less sulphur is deposited at the second or third spraying. A much greater difficulty is, however, the fact that at these two sprayings nearly all the sulphur is deposited on the leaves instead of on the wood and big buds, which positions give the most effective control. In practice a second spraying at summer strength did not appear to increase the control, no doubt for the reasons discussed above.

The only solution to the problem would appear to be either dusting with a very fine sulphur powder or making use of a sulphur cloud. The former, if sufficiently fine powder could be obtained, might result in some burning and also might be troublesome on account of the deposit on the developing berries. The latter method would appear to be very promising, but there is at present no machine capable of giving the requisite cloud under open-air and commercial conditions. An attempt is being made to devise a suitable apparatus.

*RED PLANT IN STRAWBERRIES AND ITS CORRELATION WITH "CAULIFLOWER DISEASE."**

(E. Ballard and G. S. Peren.)

Introduction.

The trouble in the strawberry plant known by the various names of "Red Plant," Red Leg," "Red Leaf," and "Small Leaf" has been recognised by some growers for a number of years. It is, however, only of recent years and more especially in 1922 and the present year that not only have the symptoms of the disease become increasingly familiar, but the distribution enormously extended. To such a degree is this the case, that in certain districts the strawberry growing industry is seriously threatened. Definite evidence is forthcoming of the existence of this trouble in Cornwall, Devon, Somerset, Hampshire, Herefordshire, Kent, Sussex, Wisbech, and the Valley of the Cldye. The disease has not been reported from Herefordshire but the symptoms have been identified in that county by one of us.

Symptoms of Red Plant.

The typical "Red Plant" as seen in early Spring may be briefly described as follows--(These refer to symptoms shown by the variety, Royal Sovereign).

General Appearance.—The more prominent symptoms are most easily recognised when growth begins in the Spring. The most marked feature of afflicted plants is the deep blood red colouration of the young petioles and the under sides of the unfolding leaflets. In the case of the latter the colouration may be more accurately described as "plum."

In comparison with normal plants, "Red Plants" tend to be undersized, this being most marked in the case of long-standing infections. In addition blindness or partial blindness is usually present.

Detailed examination reveals the following :—

Leaves and Leaf Stalks.

(*a*) *The Petiole.*—Two main types are shown. Firstly, one which tends to be swollen at the base and tapering to the apex.

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* Reprinted from the Journal of Pomology and Horticultural Science Vol. III, No. 3.

This petiole is invariably long in proportion to the size of the leaflets which it carries and generally of a deep red colour.

The second type might best be described as a petiole and leaf in miniature. Both are usually heavily suffused with red. In extreme cases these structures may be most minute.

A diagnostic character of both these types is the marked reduction in hispidity amounting frequently to a sparse pubescence.

(*b*) *The Leaflets* which are borne on petioles described under (*a*) show considerable variation. In advanced cases of infection they may be represented by mere remnants of only one or two of the midribs, and from this show all grades up to small but perfectly formed reddened leaflets. The reduction in size or complete absence of one leaflet is a frequent symptom, this condition in the latter case being accompanied by deformities in the two leaflets present. Before complete expansion these leaves may be compared in appearance with the developing fronds of bracken when but a few inches high. We feel this simile to be so apt that we have adopted the term frond to describe this condition of growth and propose to use it for such in this and subsequent papers on this subject. Working further up the scale towards normality leaflets are found in which the stunting effect is far less marked, and the deformities are reduced to curled and cup-shaped leaves, the latter being apparently due to some inhibition of marginal growth.

(*c*) *The Stipules.*—These are frequently large in proportion to length of the petiole and of a very deep red colour, but it must not be taken that this character is constant.

(*d*) *The Crown.*—The crown is usually attenuated, more especially in the case of blind or partially blind plants. In cases where the plant has apparently contracted the disease at a very early age the formation of lateral crowns may be entirely inhibited although such severe examples are rarely found. In other cases lateral crowns are produced, but these crowns are extremely small and thin and give rise to the miniature leaves referred to above (*b*). Where the infection is slight the size of the lateral crowns may be normal in comparison with the original crown, but all may be said to be undersized and attenuated.

Cauliflower Disease.

True " Cauliflower Disease " is a condition caused by *Aphelenchus fragariæ.* Ritz. Bos. The lateral crown becomes much swollen and the flowers stunted and distorted into a cauliflower-like bunch from which the disease derives its name. The blossoms when they appear show a variety of deformity. The calyx may be enormously developed and the receptacle undersized and irregularly formed. In cases of medium infection the inflorescence, instead of remaining bunched as in the true cauliflower condition, is able partially to develop, but the scape and the pedicels are much thickened and stunted and the flowers of the cyme show considerable malformation. Frequently the scape is much fasciated.

To go into the details of foliar malformation—extreme cases are those in which the petiole is represented by nothing more than a short swollen protuberance sharply tapering to a fine point which is frequently dead. Working upwards from this as the lowest expression we pass, by way of the typical fronds through the leaf with the swollen petiole and either two leaflets and a rudiment or else two leaflets and the third deformed and twisted in various ways. The next stage is a leaf consisting of three leaflets which exhibit a very characteristic crumpling or curling. In all cases where leaflets are produced by the above types they are characterised by a tough leatherly texture. In this disease as normally recognised there is no marked redness, the typical colouration being a blue-green tint about the leaves.

The miniature leaves of "Red Plant" are also often produced. These have been already described above.

CORRELATION OF THE TWO DISEASES.

After examination of a very large amount of material a constant overlapping of symptoms of " Red Plant " and " Cauliflower " disease has been definitely established.

To begin with, the typical colouration, giving the " Red Plant " its name, may greatly diminish after a few weeks. Stripped of this character the plants assume an appearance identical with mild cases of " Cauliflower Disease if the flower trusses of the latter are removed, the bases of their petioles more particularly assuming the watery green colour typical of the thickened parts of "cauliflower" plants. This loss of colour has been carefull followed in marked plants in the observation plot at this Station. This plot consists of 5,000 plants a very high proportion of which are red.

Having fully acquainted ourselves with the characters of bad cases of "Cauliflower Disease" we proceeded to work down the scale of degrees of infection noting the slightly changing symptoms. As we established the latter we found ourselves, towards the end of the scale, examining plants which normally we should have put down as "Red Plants, the symptoms merging with the finest gradation into those of the latter disease. In some cases we have found blossom trusses on red coloured "Red Plants" which we were able without hesitation to say showed symptoms of "Cauliflower Disease."

The connecting characters are as follows:—

(1) The production of the "fronds" described above in their various stages of development.

(2) Reduction in the number of leaflets.

(3) Deformity of surviving leaflets.

One type of deformity is that of a leaflet very greatly reduced in size. The marginal growth is inhibited and such leaflets have the appearance of suffering from caterpillar attack, looking as though large "bays" have been eaten out of the margin. These leaves show an inhibition so general that very little central growth takes place, which in larger stronger leaves, although the marginal growth is inhibited, the central growth proceeds more or less normally with the result that a bellying of the leaf takes place.

(4) Deformation of the leaf margin including an oak leaf type.

(5) Coarsening and thickening of the leaflet, such leaflets having a dark green colouration.

(6) Crumpling of the leaflets and the cup-shaped formation described above.

"SMALL LEAF."

Thicket.

There is yet another trouble of strawberry plants which some growers recognise as "Small Leaf."

This condition may be described as follows:—

The early stage is characterized by fine undersized growth accompanied by a certain amount of reddening, which later diminishes.

Shortly, excessive crown formation begins and is continued until a dense mat of leafage is produced. The petioles, leaflets and crowns are perfect in form but undersized, the majority of the latter being blind. Tho whole plant, in fact, appears a dense mass of undersized and attenuated growth, accompanied by partial or complete blindness.

At the bases of the crowns are found, as the result of careful examinations, numerous fronds and small deformed leaves comparable with those found in "Red Plant" or "Cauliflower" disease, and from this fact and the finding of *A. fragariæ*, we are led to conclude that *A. fragariæ* is in this case also the pathoganic organism.

CONCLUSIONS.

A consideration of all the above factors lead one to conclude that "Red Plant" and "Cauliflower" are one and the same disease and are simply either the different types of reaction on the past of the plant to the same noxious stimulus, or different degrees of infection, or again the result of infection contracted at different stages of growth. An examination of the large quantities of material which we have had at our disposal from several different districts would by itself almost suffice to convince one that the two diseases were the same, but still further and more convincing evidence is forthcoming, and this is given by the fact that *Aphelenchus fragariæ*, Ritz. Bos. can usually be found in the growing points of "Red Plants," and often in the growing point of runners on "Red Plants." Their position and method of feeding are identical with those in undoubted "Cauliflower" diseased plants, that is, they are to be found between the developing leaf rudiments on each side of the growing point.

With regard to the spread of the disease, we are led to conclude that the stolon can be infected from the parent plant and hence the young plant produced on the stolon. It is not improbable that infection can take place by boots, horses and implements, yet at the same time careful roguing of parent plants cannot fail to assure a considerable reduction.

The question of immunity of certain strains arises. All that can be said at present is that none of the 50 varieties examined to date have shown complete immunity.

It is curious to note that in certain strawberry areas where a small plant for the production of fruit is favoured "Cauliflower" is not produced in its most marked form and not until we found in the course of our investigations examples of this trouble in strongly growing plants were we able to connect the two conditions.

The term "Red Plant," "Red Leaf" or "Red Leg" is an unfortunate one as, firstly, redness does not persist even in Royal Sovereigns and, secondly, although other varieties get the disease they do not go red.

Much work of a corroborative nature remains to be done, and the methods of infection, the life history of the eelworms and possible methods of control are all problems yet to be solved. These matters are now under investigation.

THE PURPLE LEAF BLOTCH OF STRAWBERRY.

(H. R. Briton-Jones.)

·This disease, the cause of which was previously unknown, was very prevalent in the western counties this summer. It caused a considerable amount of damage to the plant. since the blotches in a good many cases involved over fifty per cent. of the total leaf surface. The variety which seemed to be most badly affected was Royal Sovereign, but other varieties were also attacked.

The disease was at first studied as being a possible bacterial or fungus disease. Cultures carefully made from the smallest spots, however, did not yield any organism which might be reasonably suspected as causing the disease. Subsequent observations in the field, however, showed beyond doubt that the trouble is due to attack by Aphis (*Myzus fragariella*, Theobald), when the leaves are still young and before they become unfolded. Examination of young leaves show the presence of Aphids between the folds. When these young leaves are unfolded by hand and held to the light the portions of the leaves which the Aphids have been sucking can be distinguished as pale green areas. As the leaves grow and become unfolded, these pale green areas turn a reddish-purple colour. There are cases where the very young leaves have been punctured in so many places that they never manage completely to unfold and expand normally. This is due to the fact that the punctured tissues are so badly damaged that they become dried up and are unable to grow. The unpunctured areas continue normally to increase in size with the result that they exert a pull on all sides of the damaged areas. Thus the affected leaves always have a crinkled appearance and the damaged areas often split. On a mature leaf the reddish-purple blotches measure from 1 mm. to 1 cm. in diameter. Leaves which have not been attacked by Aphids before they completely unfold do not become discoloured in the above manner if subsequently attacked by large numbers of Aphids. So far control measures have not been worked out, but field observations indicate that spraying will not meet the case owing to the difficulty of wetting between the close folds of the very young leaves.

PEAR LEAF BLISTER (*Taphrina bullata, Tul*).

(*H. R. Briton-Jones.*)

This infrequent disease was quite common on different varieties of Pears in many localities this summer. The fungus produces convex and concave blisters on the leaves. At first the blisters are green in colour. Later, however, they turn black on the upper surfaces of the leaves, whilst the lower surfaces become covered with a whitish covering which consists of the fruit bodies (asci) of the fungus. At an older stage the asci have a brownish appearance. Generally speaking, the disease in itself is of little importance, although the presence of a large number of blisters must interfere to some extent with the functions of the leaves. On the other hand, the importance of the disease is increased somewhat if the variety of Pear attacked is also subject to the far more serious disease Scab (*Venturia pirina.* Aderh.). The tissues of the leaves which have been attacked by the blister fungus later become infected by the scab fungus which produces hundreds of spores on the blisters, particularly on the under surfaces (See Fig. viii). The scab fungus can infect healthy tissues of the leaves, but the number of such infections were far less than those which occurred on the tissues which had been previously attacked by the Blister fungus. This is probably due to the fact that the scab spores become lodged more easily and securely on the somewhat woolly surface produced by the asci of Taphrina bullata, than on the smoother surface of the healthy leaf. It is also interesting to note that scab infections did not occur to anything like the same extent on the portions of the leaves affected by the Leaf Blister Mite (*Eriophyes pyri*). Thus by facilitating infection of the leaf by the scab fungus the Leaf Blister disease indirectly increases the source of infection of the Pear twigs and fruit by the more destructive scab fungus. The Pear Leaf Blister disease can probably, like similar diseases, be controlled by spraying with "summer strength" Lime Sulphur as used against scab, namely 1 gallon of the concentrated solution added to 29 gallons of water.

The degrees of attack on different varieties of Pears by the Pear Leaf Blister were noted this year at Long Ashton. The results are as follows :—

Name of Variety.	*Degree of Attack.*
Durondeau	Slight
Beurre d'Amanlis	Bad
Pitmaston Duchess	Slight
Triomphe de Vienne	Clean
Beurre Hardy	Medium
Doyenne de Comice	Slight
Winkfield	Slight
Emile d'Heyst	Clean
Conference	Slight
Petite Marguerite	Clean
Bellissime d'hiver	Slight
Dr. Jules Guyot	Medium

*PECTIN AND ITS HYPOTHETICAL PRECURSER "PROTOPECTIN."***

(F. Tutin.)

It has long been known that the expressed juice of unripe fruits contains very little pectin, and that when the crushed marc is subsequently extracted with cold water, only small, additional quantities of this substance are obtained. In contrast to this, when a soft, fully ripe fruit is pressed, the juice contains a considerable amount of pectin, and further, and larger quantities may readily be obtained by extraction of the marc with cold water.

When, however, an unripe fruit is heated with dilute hydrochloric acid it bcomes thoroughly disintegrated, and the liquid obtained by straining and pressing the resulting mixture is rich in pectin. This has led to the assumption that unripe fruits contain an insoluble compound which might be regarded as the parent substance of pectin, and which, by hydrolysis, during the process of ripening, or when heated with acid, becomes converted into ordinary, soluble pectin. To this insoluble compound the name "protopectin" was given by Fellenberg (1918),† and it corresponds to the "pectose" of earlier investigators. It has, moreover, been assumed that the presence of this "protopectin" was a cause of the hardness of unripe fruits, and that its gradual change into soluble pectin was a feature of the process of ripening.

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* Reprinted from the Biochemical Journal, 1923, XVII, 510.

† Fellenberg (1918) Biochem. Zeitschr. 85, 118.

After having worked for some time with pectin, however, it occurred to the present author that the generally accepted explanation of the apparent defficiency of soluble pectin in unripe fruits might not be the current one. To quote one observation: if it be attempted to filter a solution containing only a relatively small concentration (0.5 per cent. or even less) of pectin through a reasonably efficient paper it will be found that, after a very few moments, filteration becomes extremely slow. The filtrate then collected contains only a very small proportion of pectin, the greater part of the latter substance being retained on the surface of the filter as a gel-like layer. Considerable quantities of distilled water may then, in course of time, be passed through this filter, when the pectin continues to be removed, but at an extremely slow and apparently constant rate. Now it seemed that conditions analagous to this might prevail in the case of hard, unripe fruit, where really efficient disintegration of the tissue is peculiarly difficult to attain, particularly when it is considered that fruits contain products which, though soluble in alcohol, are insoluble in water, and would certainly hinder the access of the latter to the pectin occulded in the tissue.

In view of these considerations and also taking into account the fact that no direct evidence of the existence of "protopectin" has ever been obtained, the following alternative explanation of the fact that fruits not fully ripe retain part of their pectin content in an apparently insoluble form, presented itself to the author: namely, that no such substance as "protopectin" exists, but, that the persistent retention of pectin in an apparently insoluble form by the tissue of incompletely ripe fruits is due partly to the presence of substances insoluble in water but soluble in alcohol, but more particularly to the great difficulty in attaining, by mechanical means, really efficient disintegration of the unripe tissue. In other words, it is suggested that the presence of "protopectin" is not a cause of the hardness of the tissue of unripe fruits, but that the behaviour of this tissue, described above, is the effect of its dense nature.

More than two years ago a few preliminary observations were made which tended to support this view. The material employed was a very finely ground sample of dried pomace (the presscake from the cider press). Three quantities, each weighing 30 grams, were exhaustively extracted in a Soxhlet apparatus; No. 1, with water only ; No. 2, first with alcohol, and subsequently with water ; whilst No. 3, after extraction with alcohol, was heated in an autoclave at 110° with dilute hydrochloric acid for one hour, and subsequently exhausted with boiling water. The amounts of pectin obtained from the three extracts were, respectively, 1.4 gms. ; 1.6 gms.; 1.6 gms. Had "protopectin" been present the last extract should have yielded the largest amount of pectin, whilst the inhibiting effect of the presence of alcohol-soluble substances is shown by the lesser amount of pectin obtained from the first extract.

It was, therefore, decided to conduct some experiments with unripe apple tissue, taking precautions to remove all the substances soluble in alcohol and also to ensure as complete a mechanical disintegration as was possible with the means available.

The variety of apple selected for this purpose was Bramley's Seedling. The fruit for the experiment described below was picked on August 29th, 1922, when it was far from being in a ripe condition, These apples, when pressed, yielded a juice which contained only a very small amount of pectin. A quantity of the fruit was peeled, deprived of all core tissue, thinly sliced, and then placed in alcohol, these operations being conducted as quickly as possible. The weight of fresh, sliced material taken was 286 grams. The alcohol into which the sliced fruit had been placed was decanted, and replaced by fresh solvent, and this treatment was continued, at the ordinary temperature, so long as anything was dissolved from the apple tissue. The latter was then well crushed in a mortar, brought on to a filter, and well washed, first with absolute alcohol, and finally with ethyl acetate. After drying, first in the air, but subsequently in a vacuum over sulphuric acid, the material weighed only 8.9 grams. This dry material was then submitted to a very thorough grinding in a mortar and the whole of it passed through a sieve the meshes of which were approximately 1-200th of an inch square. The ground product then weighed 8.8 grams. This finely ground tissue was then well stirred at frequent intervals, for about two hours with 1300 cc. of cold distilled water* and subsequently allowed to settle for about 22 hours. The supernatant liquid decanted, and the process repeated. In all, 25 extractions were was then made. The pectin content of each of the last ten extracts was very small, and apparently constant. The residual, wet marc was then mixed with about a litre of alcohol, collected on a Buchner filter, well washed, first with alcohol and subsequently with ethyl acetate, presesd, and allowed to dry. The dry material was re-ground with fine, sifted sand* in a very thorough manner, so that the sand became crushed to micoscopic, sharp edged, flint-like fragments. After again passing the product through the above-mentioned sieve the extractions with water were repeated as before. In this case it was found that only 10 extractions were necessary to reach the point where only a very small amount of pectin was removed. The marc was then washed with alcohol and ethyl acetate and dried as previously described, after which it was again very thoroughly ground with the finely comminuated sand which had passed through the sieve after the first re-grinding. On repeating the treatment with water, as before, only seven extractions were found necessary. At this stage the material was carefully examined under a microscope, samples being taken two minutes after it has been vigorously stirred with distilled water, some from near the surface of the mixture and others from the lowest portion. The former showed only fragments of cell walls together with minute particles of silica, whilst the latter contained, in addition to salica, some small fragments of vascular tissue which has escaped complete disintegration, together with one or two groups of about three partically broken cells still adhering together. It was evident that disintergation had been very thorough, although not absolutely complete, and it was concluded that a small amount of soluble pectin would still be retained in the tissue. Nevertheless, it was not deemed necessary to continue the laborious process of grinding and extracting in order to obtain proof of the absence of "protopectin." The residual marc was therefore heated in an autoclave at 110° with N_{20} HCl under the conditions described by Carré (1922)† and subsequently extracted with distilled water four times in the manner described. The fourth extract contained an amount of pectin that was scarcely detectable. The pectin present in all the four series of extracts obtained, as above described, was, in each case, directly estimated as such. After concentration under diminished pressure, each extract was treated with a large volume of alcohol, the pectin collected, dried in a vaccum and weighed. The method proposed by Carré and Haynes (1921)‡ was not adopted as their procedure represents as pectin any acid which might happen to be present and which yields a calcium salt insoluble in dilute acetic acid. The following is a summary of the results obtained by the present author :

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* In order to ensure that the dry powder would readily mix with the water it was found convenient in the first instance to moisten it with a little alcohol.

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* Purified by extraction with acids followed by strong ignition.

† Carré (1922). Biochom. J. 16, 704.

‡ Carré and Haynes (1921). Biochem. J. 15, 60.

Weight of fresh apple tissue.	Weight of ground and dried tissue after treatment with alcohol.	Volume occupied by dry ground material.
286 grams.	8.80 grams.	About 28 cc.

	Weight of pectin from 8.80 grams of dry tissue.	Volume occupied by wet tissue on subsidence from water. (Approximate).
	grams.	cc.
1.—After fine grinding	*1·9347	330
2.—After re-grinding, with sand	*1·5104	220
3.—Again re-ground with sand	0·3238	110
4.—Autoclaved with X Cl.	0·1005	115

The volumes occupied by the marc are given as supplying additional evidence of the change produced by the various treatments.

It is seen from the above results that, after the removal of the "soluble pectin" from the original, finely ground tissue, a further and almost as great amount may readily be dissolved by treatment with cold, distilled water when the material had merely been submitted to a process of more efficient mechanical disintegration. The amount of pectin subsequently obtained after treatment with acid is insignificant, and its retention by the marc is obviously due to the fact that quite complete disintegration of the tissue had not been attained, even after the drastic grindings that had been resorted to.

The only conclusion that can be arrived at is, therefore, that "protopectin" does not exist, but that all the pectin present in the apple occurs in the ordinary, soluble form. The problem of estimating pectin in fruits, therefore, appears to resolve itself, in the first instance, into one of attaining complete disintegration of the tissue. It seems likely that this would most readily be accomplished by resorting to the treatment with dilute HCl employed by Carré (*loc. cit.*) for the hydrolysis of the supposed protopectin.

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* These two weights, particularly the first one, are very slightly greater than the actual weight of pectin obtained. This is because, during the decantation of the pectin solutions from the marc, a very small amount of the latter was unavoidably removed with the pectin solution, and it was not subsequently separated owing to the above-mentioned difficulty of filtering through a good paper solutions of pectin, which are not very dilute. The liquids decanted after the third and fourth treatments, however, were each exactly filtered, so that the weights of pectin yielded by them are strictly comparable. Nevertheless, the total percentage of pectin calculated on the weight of fresh tissue taken, appears to be high in comparison with results previously obtained. This is attributed, in part, to the efficiency of the grinding and extraction, but also, probably, to the unripe condition of the fruit, since fully ripe fruit from the same trees was found to contain at least 50 per cent. more water.

After the commencement of this work a paper, referred to above, was published by Carré, dealing with the changes which occur in the "pectic" constituents of stored fruit. The conclusions arrived at during the present investigation offer a ready explanation of some of the results there described. In the first place it is probable that the "considerable variations" in the pectin content of stored fruit observed by Carré were due, not so much to a large sampling error, as suggested by her, but to differences in the degree of mechanical disintegration of the various samples of tissue before extraction of the soluble "pectin" The great deficiency of pectin found by her in the early stages of ripening would appear to be chiefly due to lack of efficient disintegration, which is especially difficult to attain when the fruit is in an unripe condition. No special precautions seem to have been taken by Carré to ensure thorough grinding, and, in fact, she appears to recognise that this had not been attained. Thus on page 708, when describing the estimation by treatment in an autoclave at 110° with dilute HCl of protopectin in tissue which was supposed to have been already deprived of soluble pectin, she states :—"The material became thoroughly disintegrated during the process" . . . . Then again, she states that "A series of estimations of pectin and protopectins carried out at regular intervals on the same apples, showed that a very definite relationship exists between them and that the changes in the two constituents tend to be equal and opposite in amount." This, also, is obviously another result of varying degrees of inefficient mechanical disintegration. Naturally, the more pectin that can be removed after the first process of partial disintegration, the less there is left to be removed when the product has been submitted to a process which ensures complete disintegration.

It was observed by Carré that after crushing, and thoroughly washing apple tissue with water, a small amount of pectin continues to be removed during several weeks, on further treatment with water. This behaviour is attributed by the present author to the slow rate of diffusion of pectin from insufficiently disintegrated tissue.

A NOTE ON THE HYDROLYSIS OF PECTIN.[*]

(Frank Tutin.)

In a previous communication[†] the present author showed that when pectin was treated with cold, aqueous alkalis or with the enzyme, pectase, pectic acid was formed, together with methyl alcohol and acetone. It was stated, moreover, that "the proportion of acetone to methyl alcohol produced appeared to be about one part of the former to two of the latter," and, furthermore, that "it appears likely, therefore, that pectin is the dimethyl-*iso*-propenyl ester of pectic acid." This conclusion was not based on any indirect method of estimation of either the methyl alcohol or the acetone, which cannot easily be determined accurately in the presence of one another, but it was a considered conclusion based on the actual amounts of these substances obtained after their separation by a prolonged and careful fractional distillation and subsequent treatment of the "acetone fraction" with calcium chloride. The amount of material dealt with was large, and more than 3 gms. of practically pure acetone were obtained. The author sees no reason to modify his original, somewhat guarded statement.

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[*] **Reprinted from the Biochemical Journal, 1923, XVII,83.**

[†] **Tutin (1921). Biochem. J. 15, 494.**

In view, however, of several personal communications from an authoritative American source the subject appears to require a little further explanation.

The author's statement regarding the formation of acetone on cold* dydrolysis was at first denied, but has been subsequently confirmed, here and in America, but it must be pointed out that too prolonged treatment of the pectin with water at a high temperature, especially in the presence of acid, results in a loss of both methyl alcohol and acetone. It has now been stated, however, that whether the percentage of methyl alcohol yielded by pectin is calculated from the amount of alkali required to hydrolyse the latter, or estimated by Zeisel's method, practically identical results are obtained. From this it is concluded that there is hardly room for an *iso*-propenyl group in the molecule. It will at once be seen, however, that the amount of alkali required to eliminate an *iso*-propenyl group is the same as that required for a methyl group. Moreover, when employing Zeisel's method, acetone (or an *iso*-propenyl group) is converted into *iso*-propyl iodide, which readily volatilises and yields the same amount of silver iodide as would a methyl group.

This behaviour of acetone does not seem to be generally realised, and it is considered advisable to draw attention to it as several previous workers have employed Zeisel's method for estimating the methyl alcohol yield by pectin.

ACIDITY AND TASTE IN APPLE JUICES.

(Otto Grove and F. Summers.)

An electrometric method has been used for investigating the acidity of freshly expressed apple juices and also the changes in acidity which occur in fermenting apple juices.

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* Acetone is yielded by a great variety of products on treatment with hot alkali.

This method is dependent upon the concentration of hydrogen ions in the juice, and the measurement of this concentration gives a clearer picture of the physiological acidity, *i.e.*, the acidity of taste, than the usual titration methods.

The relation between the acidity as determined by titration and that determined by measuring the concentration of hydrogen ions has been obtained for thirty-three fresh juices. This relation is in no way regular and further study has shown that other constituents of the juices, *e.g.*, pectin and sugars, affect the physiological acidity by depressing the hydrogen ion concentration Such changes are not shown by a titration with indicators.

The acidity changes in four selected juices, viz., Cap of Liberty, Wootton's Carrion Red, Kingston Black and Cummy Norman, have been investigated periodically during the year by titration and by the electrometric method. Again, there has been found to be no clear relation between the two acidities in the unfiltered juices, but the measurements of hydrogen ion concentration gave a clearer picture of the acidity changes than the figures obtained by titration.

In filtered samples there was closer agreement between the two acidity values at every stage. It is possible that some of the filtrable constituents, by depressing the hydrogen ion concentration, regulate this between limits which are most suitable for the fermentation process.

A regulatory action of this kind has been shown for pectin and the sugar levulose, when added to solutions of malic acid.

THE INFLUENCE OF PRESSURE DURING THE LATER STAGES OF THE PRIMARY FERMENTATION OF CIDER.

(*Otto Grove.*)

An investigation was begun during the 1922-23 cider-making season to determine the effect of pressure during the later stages of the primary fermentation of apple juice, particularly in relation to flavour, natural clearing and rate of fermentation.

In January, 1923, nine different unfiltered ciders in different stages of fermentation were placed in soda-water syphons and kept at room temperature. As controls further samples of the same cider in glass-bottles of approximately the same size and shape as the syphons, closed with an ordinary fermentation trap to prevent access of air without increase of pressure, were kept alongside.

The syphons and bottles were held under close and regular observation. It was noted that after one month the liquid in the syphons in nearly all cases was clearer than in the controls. This difference was not so marked after two months, when in about half of the corresponding samples the ciders were equally clear in both cases, the controls by that time being mostly well advanced in natural clearing.

The syphons were opened in July, 1923. The pressure in the syphons when opened was not determined, but it was obvious when disgorging the cider from the syphons that very considerable pressure had been developed in all cases.

The following table summarises the results for the three characters above mentioned:

Kind of Cider.	*Specific Gravity.*		*Clearing.*	*Flavour.*
	Jan. 1923	*July*, 1923		
Cummy Norman—				
(*a*) Under pressure	1·029	1·016	Same as control.	Better than control.
(*b*) Control ..	1·029	1·003		
Eggleton Styre—				
(*a*) Under pressure	1·030	1·019	Ditto.	Ditto.
(*b*) Control ..	1·030	1·010		
Mixed Apples, S.E.1.—				
(*a*) Under pressure	1.010	1.003	Ditto.	Ditto.
(*b*) Control ..	1·010	1·000		
Mixed Apples, H—				
(*a*) Under pressure	1·023	1·010	Ditto.	Ditto.
(*b*) Control ..	1·023	1·002		
Kingston Black, M—				
(*a*) Under pressure	1·041	1·020	Better than control.	Much better than control.
(*b*) Control ..	1·041	1·001		
Mixed Apples, Cr. 1.—				
(*a*) Under pressure	1·023	1·009	Ditto.	Better than control.
(*b*) Control ..	1·023	1·000		
Mixed Apples, S.E.2.—				
(*a*) Under pressure	1·020	1·003	Same as control.	Ditto.
(*b*) Control ..	1·020	1·003		
Mixed Apples, Cr. 2.—				
(*a*) Under pressure	1·022	1·008	Better than control.	Ditto.
(*b*) Control ..	1·022	1·000		
Mixed Apples. S.E.3—.				
(*a*) Under pressure	1·017	1·002	Ditto.	Same as control.
(*b*) Control ..	1·017	1·000		

As will be seen from the above, the differences in the final specific gravity between the samples fermented under pressure and the controls were generally material and in some instances quite remarkable, in the case of Kingston Black being as much as 19 points, which corresponds very nearly to 5 per cent. of sugar. In only three cases—very rapidly fermenting juices from mixed fruit

—were the differences less than 8 points. It may therefore be concluded that fermentation under pressure during the later stages of primary fermentation proceeds more slowly than under ordinary atmospheric pressure. The point is one of important possibilities for the production of natural sweet ciders under commercial conditions. The evidence at present available does not justify an attempt to explain this pressure effect, but further investigation may furnish the reason.

Another fact established by these experiments is that cider fermented under pressure is better in flavour than the corresponding control. This improvement was very marked in some cases. The fruity aroma was also much more pronounced and in many cases the difference in this respect in comparison with the control was very striking.

The fruity aroma of a cider is to a large extent dependent upon volatile esters, partly from the apples and partly developed during the fermentation ; as these bodies are very volatile, they are partly lost during ordinary fermentation.

An attempt was made to collect these volatile aromatic bodies developed during the fermentation of cider by connecting two casks containing the fermenting juice of Kingston Black apples, which produce a specially aromatic cider, with bottles placed in such a way that all the gas evolved during fermentation had to pass through the bottles. The collecting bottles were kept at a temperature of—10° C., one of them empty, the other half filled with a mixture of equal parts of alcohol and water. After two months the collecting bottles were examined and it was found that the liquid in the bottle containing the alcohol mixture had a faint fruity odour, which, however, soon disappeared at ordinary temperature. In the empty bottle no volatile substances were collected. Probably a much lower temperature than was available is needed to collect these very elusive aromatic esters. .

As regards the extent of clearing of the ciders the final result as between those under pressure and those not under pressure did not as a rule present much difference. There was, however, as already indicated, a definite difference in the rate of clearing, the pressure-treated ciders clearing earlier. Since, as has been shown, there was a material difference in the extent to which fermentation proceeded in the two series, the controls fermenting to a greater degree of attenuation, it is likely that their slower rate of clearing was associated with this behaviour, the yeast remaining active over a longer period and therefore not being deposited so rapidly.

It remains to be seen from further investigation whether practical use can be made of the advantages of fermentation under pressure which this research, so far as the first season's trials go, appears to have definitely established.

CIDER STORAGE EXPERIMENTS, 1923.

(*Otto Grove.*)

The difficulty of prevention of deterioration in cider under ordinary conditions of storage in wood after the cessation of active fermentation is recognised by all cider makers. The deterioration referred to is mainly due to acetification, which is the result of the action of acetic bacteria on the weakly-alcoholic beverage in the presence of oxygen. So long as entry of air into the storage vessel is prevented by the maintenance of an adequate pressure of carbon dioxide in the liquor, the latter can be kept in sound condition: but when, as the cider ages during the spring and early summer following the making season, the generation of that gas becomes less and less and finally practically ceases, unless the storage vessel is gas-tight the internal carbon dioxide pressure gradually approaches vanishing point and access of air to the liquor follows with the inevitable acetification. The extent of the latter is variable, being dependent upon well-known factors, but the degree of gas-tightness of the storage vessel is the first consideration.

In practice these vessels are in the great majority of cases wooden casks, the degree of porosity of which and the closeness of fitting of the individual staves vary materially. The size and shape of the cask determine the proportion of surface of wood to volume of liquor and are therefore important in this connection. Hence the larger cider makers with their great storage casks holding several thousand gallons of liquor are less affected on that account than the smaller maker who stores in pipes or hogsheads: but to all the introduction of a gas-tight storage vessel of reasonable cost, whether of wood or other material, would be a boon. Hitherto all gas-proof vessels, such as glass-lined cement tanks and glass-enamelled steel tanks, have been almost prohibitive in cost. On that account experiments on storage vessels have recently been started at Long Ashton. It is unlikely that a satisfactory solution to a problem of this kind will be quickly arrived at: nevertheless some of the observations made and the data collected in the various experiments appear worth putting on record, both as a presentation of facts bearing on the problem and a possible help to other workers. The following account of the 1923 trials is therefore contributed as a progress report on the subject.

In the first instance an attempt was made to prevent evaporation and render gas-tight casks of the hogshead size by the application of various covering materials to the wood, the object being to block the pores of the latter and to fill any gaps between the staves.

Seven casks were selected as nearly as possible alike. The casks were freshly emptied wine casks made of chestnut, each with a capacity of 50 gallons. One cask was kept as a control. Two were treated with paraffin wax, the paraffin wax being sprayed hot into the dry cask, so that the whole inside surface was covered with a thin, even layer. Two casks were treated with a proprietary varnish, A, and two were varnished on their outside with ordinary oak-varnish.

All the casks were filled with the same cider and closed by means of long tapering wooden bungs covered with several layers of calico treated with hot paraffin wax and driven tightly into the bunghole. The lower ends of these bungs dipped into the cider, shrinkage by dessication thus being prevented. The casks were kept in a part of the cider house where they were exposed to a considerable amount of draught.

The filtered cider used for the experiment had the following composition when placed in the casks on March 3rd, 1923 : specific gravity, 1.013 ; total acid (as malic) .57% ; volatile acid (as acetic) .036% ; tannin .18% ; alcohol 3.2%.

After three months a small sample was taken out of some of the casks for analysis, the quantity removed being replaced with the same amount of the same cider, kept in reserve for this purpose in a sealed container. The analyses were as follows :

	Specific Gravity.	Total Acid %	Volatile Acid. %
Control Cask	1.009	.58	.056
Waxed Cask, No. 1	1.008	.56	.060
"Varnish A" Cask, No. 1	1.010	.62	.086
Varnished Cask, No. 1	1.008	.60	.073

It will be seen that the specific gravity had fallen 3—5 points, that the total acid had increased in the case of the last two samples and that there was a marked increase in the amounts of volatile acids in all cases.

All the casks were finally examined after six months with the following results :

	Loss by Evaporation. c.c.	Specific Gravity.	Total Acid.	Volatile Acid. %	Growth on surface of liquid.
Control Cask ..	8020	1.005	.46	.104	A little mycoderma.
Waxed Cask, No. 1	8330	1.002	.44	.139	Some mycoderma.
Waxed Cask, No. 2	8970	1.002	.40	.090	A little mycoderma.
" Varnish A " Cask, No. 1	8320	1.005	.55	.099	Some mycoderma.
" Varnish A " Cask, No. 2	6180	1.005	.52	.094	Some mycoderma.
Varnished Cask, No. 1	7120	1.003	.46	.097	Hardly any mycoderma.
Varnished Cask, No. 2	6170	1.002	.46	.084	A little mycoderma.
Control in bottle (bottled 3rd March, 1923)	Nil	1.007	.47	.054	

The first column in the above table shows that the loss due to evaporation varied between 8970 c.c. corresponding to 4% and 6180 c.c. corresponding to 2.7%. The smallest loss took place in the " Varnish A " cask No. 2 and in the varnished cask No. 2 ; in both cases the loss was about three-fourths of the loss in the control.

As regards the specific gravity, it was lowest in the waxed and in the varnished casks. The total acid was highest in the " Varnish A " casks. The figures for the volatile acids give an indication of the acetification that had taken place during storage. The difference between the control and the treated casks was not very conspicuous. The high figure for waxed cask No. 1 was probably due to a small crack at the top of the cask.

There are some features of interest in these results which are in some respects outside the scope of the present subject : their consideration must be deferred for a more appropriate occasion.

Comparing the flavour of the samples, all tasted somewhat acetic; in other respects the difference in flavour was not very marked. The samples from the varnished casks seemed somewhat inferior to the control. The samples from the " Varnish A " casks had a slight aftertaste due to the preparation.

From these results it did not appear that the different treatments of the casks had produced any appreciable advantage compared with the untreated cask.

In France most of the modern cider-factories, even quite small ones, store their cider in closed tanks made of concrete lined with glass plates. In such containers the cider keeps very well indeed. No evaporation takes place, and the liquid is completely excluded from the influence of the air. The glass lining is, however, costly and it therefore seemed worth while in conjunction with the foregoing trials to try to cover the concrete and render it non-porous in a cheaper way.

Some small cube-shaped containers were made of a mixture of one part of cement, two parts of sand and 5% of "Pudlo." The containers had an open top and a capacity of just over one gallon. These concrete vessels were treated in several ways; after a good many experiments it was found that a mixture of 85 parts of paraffin wax and 15 parts of resin, melted together and applied hot to the inner surface of the container, gave a good covering and penetrated sufficiently into the pores of the cement to make it a lasting and effective coat. The hot mixture had to be applied twice to give a sufficient effect.

Two vessels treated in this way were filled as completely as possible with cider and covered with a glass-plate sealed down with wax. The cider (specific gravity 1.020, malic acid .65%, tannin .20%) was kept in these containers for nearly a year and compared with the same cider kept in bottles. By the comparison it was found that the cider did not differ materially from the bottled control. There was no earthy or metallic flavour, as in the case to a very high degree with cider kept in uncoated cement containers. The only difference was that the cider in the cement vessels and fermented down to a specific gravity of 1.008, whereas the cider in the bottles had a specific gravity of 1.014. This was probably due to the fact that the sealing of the concrete vessel was forced open several times by the gas pressure and had to be remade. Thereby some access of air took place and fermentation was stimulated.

The season's results therefore suggest that it may be practicable to construct concrete tanks of suitable size treated with the resin-wax mixture which will be relatively cheap and serve as efficient substitutes for the expensive glass-lined cement vessels. Larger-scale trials are being proceeded with. On the other hand the respective cask treatments tested gave little promise of ultimate success in that direction.

THE INFLUENCE OF DIFFERENT SALTS AND ACIDS UPON THE GROWTH OF THE CIDER SICKNESS BACILLUS.

(Otto Grove.)

It has been shown in previous work at Long Ashton that acids have a preventive influence upon the growth of the cider-sickness bacillus and it has been supposed in some quarters that exceptionally low contents of mineral salts in the cider favoured the development of the organism. A series of experiments has therefore been made to determine the toxic strength of various acids and salts significant for the cider industry.

The nutritive medium used for this experiment was yeast-water (prepared by boiling press-yeast with water) plus 5 per cent glucose. In this preparation the bacillus grows with great vigour. The medium was added to the different salts and acids in varying proportions as indicated in the table below, inoculated heavily with a culture of the bacillus, and the culture flasks were placed at 25° C. and kept under observation for six weeks. If no development of the bacillus took place within six weeks, it was concluded that growth was prevented by the addition of the respective substance. As a rule, when growth took place, it developed in 3-5 days.

The + sign in the table indicates growth, the - - sign indicates no growth.

Percentage added.	·02	·03	·04	·05	·06	·07	·08	·09	·1	·2	·3	·4	·5	·6	·7	·8	·9
Potassium tartrate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potassium chloride	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Potassium sulphate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium chloride ..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	—	—	—
Sodium sulphate ..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sodium benzoate..	+	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—
Calcium sulphate..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Calcium chloride ..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Magnesium chloride	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—	—	—
Citric acid ..	+	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—
Malic acid ..	+	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—
Tartaric acid ..	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—	—	—
Phosphoric acid ..	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—	—
Sulphuric acid ..	+	+	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Boric acid ..	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—	—
Salicylic acid ..	+	+	+	+	+	—	—	—	—	—	—	—	—	—	—	—	—
Lactic acid ..	+	+	+	+	+	+	+	+	+	+	+	+	—	—	—	—	—

It will be noted that the salts in the above table have no deterrent action in the quantities dealt with here, with the exception of magnesium chloride, of which an addition of .3% prevents growth, sodium benzoate, of which .5% is necessary and sodium chloride, in the case of which .7% has to be added to stop growth.

As regards acids, of those of natural occurence in fruit tartaric acid seems to be most effective, .3% being required to prevent growth, whereas .5% of citric, malic, and lactic acid is necessary to produce the same effect. Sulphuric acid has a strong action, an addition of .05% completely stopping growth. Salicylic acid was fatal when .07% was added and boric acid when the liquid contained .4%.

Some combinations of salts and organic acid were tried and it was found that .3% malic acid in combination with .2% sodium chloride and .2% tartaric in combination with .2% sodium chloride prevented growth.

An addition of 6.5% by weight of alcohol was found to be necessary to prevent the development of the bacillus.

CIDER-MAKING TRIALS FOR THE SEASON 1922-1923.

(*Otto Grove.*)

The 1922 crop of vintage apples was more distinguished by quantity than quality. In nearly all districts the crops were very heavy, but from the cidermaker's point of view the apples were not very satisfactory. The juices were thin with a low sugar content, the average specific gravity of all the juices being only 1.047, which compares unfavourably with the average of 1.060 obtained with the 1921 juices. This fact was probably due to the cold and wet spring and summer, the apples not being able to get sufficient sunshine to mature properly. The low specific gravity of the juices had naturally a pronounced influence upon the resulting ciders, which in many cases lacked body and fullness of flavour.

In the tables appended will be found a list of 55 ciders and perries made during the season from separate varieties of apples and pears. Besides these a number of lots of mixed apples from different districts were made up, keeving, racking and other experiments being carried out with them.

In some of the latter a method of removing the fermentation organisms by settlement was tried. It consisted in racking the cider into flat square wooden vessels, where it was allowed to settle for varying lengths of time. The cider was then drawn from the yeast-deposit into a similar vessel, where it was left to deposit again for 24 or 48 hours and then racked into a cask. By this method it was possible in some cases to check the fermentation to a certain extent as compared with ordinary racking, but the results were not conclusive, and the method will be tried again this season. Upon the whole the racking and keeving experiments carried out did not give very encouraging results and it was in many cases found to be impossible by those methods to check fermentation sufficiently to retain as much sweetness in the cider as is generally desired by the public. In most cases a dry cider was the result. As is well known, juices behave very differently as regards rates of fermentation, and the thin and fairly quick fermenting juices typical of the season did not lend themselves well to treatment by racking with the object of producing a sweet cider.

Experiments are in hand with a filter of a simpler and cheap construction than those at present on the market. It is hoped that they will lead to the construction of an efficient filter, the price of which would not be prohibitive for the farmer or the small cider-maker.

Several ciders from culinary varieties were made. The Bramley's Seedling cider was made very late (February 26th) from a lot of small apples sent in for trial. The apples were not at their best and the resulting cider was rather thin and without much flavour. The Worcester Pearmain juice was distributed in five casks, of which one was filtered when the specific gravity after 12 days had fallen to 1.025, another cask when the specific gravity had fallen to 1.020, the third cask at 1.015, the fourth at 1.010 and the fifth cask was racked and not filtered. When the samples were compared after about six months the first filtered sample was a very good cider of pleasant flavour with the particular aroma of the apple well marked, the second was not quite so good, although fairly pleasant, the two last filtered were rather thin and insipid, and the unfiltered sample was not clear and inferior to the rest of them. All the Worcester Pearmain ciders lost somewhat in quality during longer keeping. Lane's Prince Albert and Warner's King produced fairly pleasant ciders of the sharp type, which lend themselves well to blending with sweet and bitter-sweet varieties. A number of blends of ciders made from culinary varieties with ordinary ciders were made up as stated in the following table and tested for quality on the occasion of the Annual Tasting day. They were judged to be good ciders, similar in flavour and aroma to the best ciders made from mixed apples.

Of the sharp varieties on the list, No. 1, Lambrook Pippin, was a fine cider with excellent flavour. This apple deserves to be cultivated more extensively, as it is a good grower and cropper, keeps remarkably well and produces generally a slow fermenting juice. Spice apple gave a very useful sharp cider, and Crimson King was acceptable although thin. Tom Putt and Goose Apple were both very fair, but the first named lost in flavour during the summer. Frederick was not quite so good as usual for this excellent variety. The Foxwhelps were very fair, the best sample being No. 11, which was a good representative of the type. Cap of Liberty, No. 13, was a very good cider, but the typical flavour was not so pronounced as it is in better vintage years. Nine samples of Kingston Black were made up; of these Nos. 15, 17, 19, and 21

No.	Name of Variety.	District where Grown.	Date of Making.	Specific Gravity of Fresh Juice.	Malic Acid per cent.	Tannin per cent.	Rate of fermentation at 25°C.	Date of Filtering	Specific. Gravity May, 1923.
	APPLES—								
	SHARP VARIETIES—								
1	Lambrook Pippin	Martock, Som.	15th December	1·042	0·54	0·20	4·0	9/1/23	1·024
2	Spice Apple	North Cadbury, Som.	15th December	1·042	0·63	0·17	3·0	2/1/23	1·025
3	Crimson King	Chard, Som.	21st November	1·044	0·64	0·17	4·1	21/12/22	1·025
4	Tom Putt	Ledbury. Her.	16th November	1·048	0·68	0·15	6·0	6/12/22	1·030
5	Goose Apple	Hereford	11th November	1·045	0·60	0·17	3·3	15/12/22	1·030
6	Frederick	Monmouth	30th November	1·047	0·68	0·11	4·1	22/12/22	1·030
7	Foxwhelp	Nunnington. Her.	23rd November	1·061	1·05	0·33	5·8	1/1/23	1·028
8	,,	Withington, Her.	26th October	1·054	0·66	0·28	6·6	4/12/22	1·031
9	,,	Yatton, Som.	21st November	1·050	0·93	0·28	3·2	28/12/22	1·033
10	,,	Credenhill, Her.	10th November	1·054	0·93	0·31	3·8	12/12/22	1·034
11	,,	Ledbury, Her.	15th November	1·060	1·12	0·36	3·7	28/12/22	1·034
12	Cap of Liberty	Martock, Som.	15th December	1·049	0·86	0·22	2·3	4/1/23	1·025
13	,, ,,	,, ,,	23rd November	1·051	0·95	0·21	3·0	15/12/23	1·034
14	Kingston Black	Credenhill, Her.	20th November	1·054	0·63	0·19	2·7	20/1/23	1·024
15	,, ,,	Kingsweston. Som.	20th November	1·057	0·61	0·21	3·8	6/1/23	1·026
16	,, ,,	Spetchley, Wor.	17th November	1·057	0·59	0·22	3·1	22/1/23	1·027
17	,, ,,	Withington, Her.	28th November	1·050	0·59	0·18	3·0	18/1/23	1·027
18	,, ,,	Moorhampton, Her.	16th November	1·054	0·51	0·20	3·3	24/1/23	1·028
19	,, ,,	Hele, Devon	20th November	1·055	0·52	0·19	2·5	3/2/23	1·028
20	,, ,,	Congresbury, Som.	2nd November	1·063	0·75	0·26	4·8	30/12/22	1·029
21	,, ,,	Ledbury, Her.	20th November	1·055	0·63	0·20	3·1	3/2/23	1·036
12	,, ,,	Hereford	20th December	1·061	0·59	0·19	2·6	26/2/23	1·025
23	,, ,,	,,	20th December	1·061	0·59	0·19	2·6	12/3/23	1·028
	SWEET VARIETIES.								
24	Sweet Alford	Long Ashton, Som.	24th October	1·045	0·28	0·13	5·0	20/11/22	1·015
25	,, ,,	Newton Abbot, Dev.	30th November	1·050	0·20	0·13	2·8	18/1/23	1·022

26	Eggleton Styre ..	.. Long Ashton, Som.	7th November	1·048	0·38	0·11	6·5	28/11/22	1·018
27	” ”	.. ” ” ..	7th November	1·051	0·25	0·12	5·7	4/12/22	1·018
28	” ” ..	.. Ledbury, Her. ..	13th December	1·065	0·36	0·20	4·6	25/1/23	1·020
29	Dymock Red	.. Lydney, Glos. ..	20th December	1·042	0·33	0·11	3·8	16/1/23	1·018
30	Thomas Hunt ..	.. North Cadbury, Som.	12th December	1·056	0·23	0·16	3·8	2/1/23	1·019
31	Slack-ma-Girdle ..	.. Newton Abbot, Dev.	30th November	1·044	0·18	0·11	3·1	16/1/23	1·021
	BITTERSWEET VARIETIES—								
32	Royal Wilding ..	.. Byford, Her. ..	27th November	1·047	0·26	0·23	5·0	13/1/23	1·018
33	Cherry Norman ..	.. Long Ashton, Som.	25th November	1·043	0·28	0·26	3·0	28/12/22	1·022
34	Knotted Kernel	.. ”	21st November	1·049	0·34	0·24	5·6	15/12/22	1·022
35	” ” ..	.. Byford, Her. ..	30th November	1·049	0·28	0·27	4·1	15/1/23	1·023
36	Chisel Jersey	.. North Cadbury, Som.	16th November	1·062	0·26	0·52	5·6	1/2/23	1·022
37	Yarlington Mill	” ” ”	4th December	1·050	0·24	0·33	5·2	17/1/23	1·023
38	American Norman ..	.. Moorhampton, Her.	11th November	1·045	0·28	0·34	4·0	22/1/23	1·025
39	White Norman ..	.. Withington, Her. ..	26th October	1·051	0·20	0·39	4·2	27/12/22	1·028
40	Royal George ..	.. Easton-in-Gordano, Som.	12th October	1·050	0·23	0·23	5·2	23/12/22	1·034
	CULINARY VARIETIES—								
41	Bramley's Seedling ..	.. Hereford	26th February	1·038	0·66	0·08	9·0	12/3/23	1·014
42	Worcester Pearmain ..	.. Chelmsford	22nd September	1·040	0·26	0·10	14·0	3/10/22	1·020
43	Lane's Prince Albert ..	.. Ross, Her.	8th December	1·042	0·69	0·10	8·3	19/12/22	1·025
44	Warner's King ..	.. Churchill, Som. ..	12th October	1·042	0·98	0·09	9·5	19/10/22	1·030

BLENDS OF CULINARY VARIETIES WITH CIDER VARIETIES.

45 Worcester Pearmain (2 parts), Kingston Black (1 part).
46 Worcester Pearmain (4 parts), Foxwhelp (1 part).
47 Newton Wonder (2 parts), Chisel Jersey (1 part), Kingston Black (1 part).
48 Bramley's Seedling (3 parts), Sweet Alford (2 parts), Kingston Black (1 part).
49 Lane's Prince Albert (4 parts), Worcester Pearmain (3 parts), Knotted Kernel (3 parts).
50 Warner's King (1 part), Worcester Pearmain (3 parts), Chisel Jersey (2 parts).
51 Crimson King (2 parts), Knotted Kernel (1 part)

No.	Name of Variety	District where Grown.	Date of Making.	Specific Gravity of Fresh Juice.	Malic Acid per cent.	Tannin per cent.	Rate of fermentation at 25°C.	Date of Filtering	Specific Gravity.
	MIXED APPLES.								
52	Mixed Apples—Cap of Liberty Sweet Alford, Strawberry Norman, Skyrme's Kernel and Foxwhelp.	Tibberton Trial Orchard	4th December	1·050	0·66	0·21	3·6	4/1/23	1·023
53	MixedApples—KingstonBlack Ecarlatine,Skyrme's Kernel, Royal Wilding, Cummy Norman and Sweet Alford.	Hardwick Trial Orchard	20th November	1·048	0·37	0·17	3·0	15/1/23	1·022
	PEARS—								
54	Butt	Norton, Glos.	25th October	1·053	0·48	0·09	4·6	23/1/23	1·025
55	Oldfield	,, ,,	26th October	1·055	0·50	0·07	5·0	23/1/23	1·028

were judged the best and were fairly good types of this well known variety. In the case of No. 22 some of the juice had been pasteurised at 70° C. and was fermented with the following pure yeast types :— No. 4 (isolated from a Frederick cider), and No. 6 (isolated from a Kingston Black cider). They were both judged to be a little cleaner in flavour than the control fermented in the ordinary way, No. 6 giving the best result.

Of the sweet varieties No. 25 was a fair sample of the Sweet Alford type. Nos. 26 and 27 from the cider orchard at the Institute were made from a row of trees, of which half are in the grass part of the orchard, the other half in the cultivated part. The juice made from the apples from the cultivated part had the higher specific gravity, but the ciders did not otherwise show any appreciable difference. The other sweet varieties were not of special merit, the best being Nos. 28 and 31, which were both very fair specimens.

The bittersweet varieties had nearly all been tried before on several occasions and were fairly good samples. Two of them, viz., No. 38, called American Norman locally, and No. 40, Royal George, have not been tried previously; both of them gave fairly good ciders, the last mentioned being the more full bodied of the two.

Two lots of mixed apples from two of the trial orchards were made up and both of them produced good ciders; No. 52 from the orchard at Tibberton was the better, a full bodied cider with a well balanced flavour.

The two perries were somewhat flavourless when first made, but developed into very good perries after some months keeping and have kept their qualities well after about one year in bottle.

COLD-PROCESS FRUIT PRESERVES.

(B. T. P. Barker and Otto Grove.)

Some experiments have been carried out to investigate the possibility of making preserves of fruits (jams, jellies and fruit-juices) without the application of heat. When such preserves are made in the usual way, they are, during their preparation, exposed to high temperatures for varying lengths of time, to the great detriment of their flavour and aroma and, frequently, of their colour. It was recognised that if it were possible to make similar preserves without using high temperatures, the volatile aromatic bodies, contributing largely to the flavour of the product and lost during the heating, would be retained and the preserve would possess the same delicious flavour as the fresh fruit. Also from another point of view an advantage would be gained, viz., that of the preservation of the so-called accessory food factors (vitamines), which are largely destroyed by heat. It has now been established that the great dietic value of fresh fruit depends not alone upon the sugars, salts and acids contained in the fruit but also upon the content of these substances, which are present in very minute quantities.

At the outset it must be emphasized that the keeping of such preserves prepared in the cold presents some difficulties in comparison with preserves made in the usual way, where the microorganisms present in the fruit and other sources of infection and capable of causing deterioration of the product, are killed by heat. In the case of a jam or jelly made by the " cold " method, the constituency of the product must be made such that these microorganisms do not develop. This can be done either by increasing the sugar content or by adding preservatives. Obviously the first method is preferable ; the object is, therefore, to aim at such a concentration that the micro-organisms present will not develop. This is generally the case when the percentage of sugar is 62—65, or lower if the acidity of the fruit is high.

These experiments have been essentially of a preliminary character and will be continued when soft fruit is again available.

Several methods have been tried, *e.g.*, (a) mixing the fruit with the necessary sugar, (b) mixing the expressed juice with sugar or sugar syrup to make a jelly, and (c) expressing the juice, boiling the press-residue with water and mixing the filtered extract when cold with the juice before adding the sugar.

" *Cold-process Jams.*"

A number of these preparations have been made, the general procedure being to crush the fruit and mix it as intimately as possible with sugar. The difficulty is to get the fruit pulp to take up sufficient sugar. Different sugars have been tried, also different preparations of amorphous sugar, but it has not yet been possible to get the sugar satisfactorily dissolved. The jams after some time in most cases separated into two layers, with the fruit pulp at the top and the juice at the bottom. Very often slight fermentation took place They were kept at room-temperature for six months in ordinary jam-jars covered with paper.

Raspberries, strawberries, black currants, red currants, plums and gooseberries were tried. The amount of sugar varied, but generally about three parts of suger to two parts of fruit were used. The best results were obtained with gooseberries, where the jam formed a soft gel.

"*Cold-process Jellies.*"

The preliminary results obtained were much more satisfactory than with the jams. In this case only the freshly expressed juice was used : it was mixed with either cane sugar, sugar syrup, invert sugar syrup or combinations. The sugar syrup used was made with cane sugar, of which it contained 67—68%. The invert sugar was made by boiling cane sugar with 0.1% tartaric acid and water : it contained about 75% of invert sugar. In some cases there was also added an extract made by boiling the press residue with a little water, pressing again and cooling.

The juices of red and black currants were made with cane sugar, sugar syrup, invert sugar and press residue extract in varying proportions. The jellies were put into ordinary glass-jars and kept under observation for at least six months at room temperature. Several were failures owing to inadequacy of "gel," or deficient keeping quality, or both. It was found that the samples made with sugar syrup kept better than samples made with sugar. The following samples gave the most promising results :—

Red currant juice	100	parts by weight	Fair gel, flavour as fresh fruit, colour good. Slightly cloudy at top of jar, otherwise clear.
Sugar Syrup	.. 200	,, ,,	
Red currant juice	100	,, ,,	Slight gel, good flavour and colour.
Sugar Syrup	.. 100	,, ,,	
Invert sugar syrup	100	,, ,,	
Black currant juice	50	,, ,,	Fairly good gel, flavour excellent.
Sugar syrup	.. 125	,, ,,	
Black currant juice	50	,, ,,	Good gel, flavour very good.
Sugar syrup	.. 150	,, ,,	
Black currant juice	50	,, ,,	Good gel, good flavour, colour pale.
Sugar syrup	.. 100	,, ,,	
Invert sugar syrup	50	,, ,,	

"*Cold-process Fruit Juices.*"

The ordinary fruit juices, used extensively in France and the south of Europe diluted with water as a summer drink, and in Germany and the north of Europe also made into fruit soups with barley, sago or other cereals, are prepared by boiling the juices expressed from the fresh fruit with sugar. Their flavour, as with jams and jellies, is very detrimentally affected by the high temperature and does not compare with the flavour of juices made by the "cold process."

The juices prepared at Long Ashton without the application of heat were made from loganberries, raspberries, black currants and blackberries.

After trying several methods the following mode of preparation, which has upon the whole given satisfactory results, was adopted. The berries were well broken up and placed in an open vessel in a fairly warm place for a period varying from 4 to 5 days. Within that time there was slight fermentation, the pectin substances being precipitated and the gelling of the juice after the addition of sugar thereby prevented. In the case of blackberries it was found necessary to add a little sugar or, better, 10—20% of fresh apple juice, to get a satisfactory fermentation and precipitation of the pectins. After the fermentation the whole was pressed and the expressed juice mixed with sugar and put into a closed container, which was shaken up every day for a couple of weeks, more sugar being gradually added so that there was always undissolved sugar present. The object was to obtain a saturated solution of sugar in the juice. The juice was then filtered through flannel and put into closed bottles, which were only partially filled to make the keeping test more severe.

The juices have been stored in this way for over two years and have kept very well. There has been no fermentation and only in some cases a little sugar has deposited in the flasks. The colour and flavour is very good. The percentage of sugar present in the juices varies from 62.5 to 64.5.

This preliminary work has shown the possibility of the production of cold-process fruit juices and jellies of high quality in respect of flavour, appearance and keeping properties. Whether or not the methods are suitable for development under commercial conditions larger-scale trials, which it is proposed to carry out at the Campden Research Station, will demonstrate.

NOTES ON STRAWBERRY BREEDING.

(G. T. Spinks.)

The work on the breeding of strawberries, to which reference has been made in previous Reports, has now reached a stage at which it seems desirable to give some account of the results which have already been obtained. This work must be regarded largely as a preliminary to further breeding in which the experience already gained can be utilised. The object of the breeding work is the production of new varieties which will be superior to the old ones, and in the hope of finding out what combinations of parents are likely to lead to this result most quickly a large number of different crosses have been made, though only comparatively small numbers of plants of each family have been raised. Having now gained some of this preliminary information larger numbers of the most promising families will be raised, and it may then be possible to discover more of the genetics of various characters.

When making a cross one particular character was usually aimed at, though the parents used always had other desirable qualities in addition, and therefore at the present stage it seems best to state the results under the headings of the various characters. It should be noted that the following figures were usually obtained from observation of single plants for not more than two years, but in some cases plants have been propagated by runners, and observations have therefore been obtained from larger numbers of plants for several years.

CROP.

The fruitfulness of a plant is one of the most important characters to be considered, for unless a variety bears heavy crops it is almost useless, at all events from a commercial point of view. The size of the crop of single plants has been estimated by eye, but where larger numbers of plants have been available a certain number of records of crop weights have been taken.

Crops have been arbitrarily classified as poor, moderate, fairly good and good, the last classification indicating a really heavy crop, though in a few cases the crop has been thought to merit the description very good.

No seedlings whose crop was not at least fairly good have been considered worthy of further trial.

Some of the most interesting observations made on the fruitfulness of different families of seedlings are as follows :—

Bedford Champion × *King George V*. (Laxton). Out of a family of 235 seedlings, 57 were noted as fairly good croppers and 25 as good, while 57 were poor. Both the parents are good croppers.

King George × *Black Prince.* A small family of 20 plants, but of these seven bore fairly good and six good crops.

Scarlet Queen × *King George.* A family of 179 contained 45 plants with fairly good crops, and 14 with good crops, while 32 were only poor croppers.

The Duke × *White Perpetual.* A very small family, only 20 plants, but of these nine bore good crops.

La Productive × *Keen's Seedling.* Out of 63 plants, 27 were fairly good croppers and six good.

Royal Sovereign × *Keen's Seedling.* A small family of 22, but these included 10 fairly good and two good croppers.

Maincrop × *Laxton.* Sixty-two plants included 27 with fairly good and 14 with good crops.

Maincrop × *Royal Sovereign.* A family of 35 gave 15 fairly good and seven good croppers.

The Earl × *Unique.* Twenty-five fairly good and eight good croppers were obtained from a family of 71.

St. Antoine × *The Earl.* A family of 38 contained 11 plants with fairly good and five with good crops.

The above list includes the families which, up to the present, have given the largest proportion of heavy-cropping plants. Other families which have given slightly less satisfactory results are:—

King George × *The Duke, King George* × *White Perpetual, Vicomtesse* × *The Earl, Fillbasket* × *Bedford Champion, Vicomtesse* × *King George King, George* × *St. Antoine.*

Families which have given disappointing results considering the cropping powers of their parents are: *Bedford Champion* × *Maincrop* and the recriprocal cross, *Cropper* × *Vicomtesse,* and the recriprocal cross, and *Royal Sovereign* × *King George.* The last-named cross gave 46 poor croppers and only eight fairly good croppers out of a family of 114. The poor records of some of these families cannot always be considered conclusive, as in some cases a family has possibly been planted on a bad strip of soil. Good croppers have also been obtained from families not named above, but they do not form a large proportion of their families. *Bedford Champion, Keen's Seedling, King George, Maincrop, Royal Sovereign, The Earl, The Duke* and *Vicomtesse* have all been found satisfactory parents to use when breeding for crop, though their progeny do not necessarily always include a large proportion of good croppers.

EARLINESS.

Earliness in ripening being a very valuable quality in a strawberry, many crosses have been made with the object of producing early varieties. When a cross is made between two early varieties it has been found that a large proportion of the resulting seedlings are of second early season, while there are also varying numbers of early and maincrop plants and occasionally a very few late varieties. An early variety crossed with a perpetual fruiter appears to give much the same result as the above, while if one of the parents is an early and the other a second early or a maincrop variety the majority of the seedlings usually tend more towards the maincrop season and there are fewer earlies though still a fair number of second earlies.

Occasionally, however, a cross in which one of the parents is a maincrop variety gives an unexpectedly large proportion of early seedlings.

The crosses which have given the largest proportion of early seedlings are as follows :—

King George × *Black Prince.* A small family of 20 plants, but of these 10 are earlies.

King George × *The Duke.* Also a small family ; 16 plants, of which six are earlies.

Maincrop × *Royal Sovereign.* A maincrop variety crossed with an early, but a family of 35 plants contains 12 earlies.

Maincrop × *The Laxton.* Here again one parent is a maincrop variety, but in the family of 62 there are 10 early plants.

Vicomtesse × *King George.* Twelve early plants in a family of 61.

The Bedford × *Keen's Seedling.* A cross between a maincrop and a second early ; the family of 57 contains 11 early seedlings.

The Duke × *White Perpetual.* A small family of 20 plants includes five earlies.

The Earl × *Unique.* Sixteen early seedlings out of a family of 71.

Many other families besides those mentioned above contain a number of early plants, though not so large a proportion, and the fact that a family contains only a small proportion of early plants does not necessarily mean that some of the individuals are not as early as, or earlier than, the individuals in a family containing a larger number of early plants.

Whether any of these early plants which may have been selected for propagation are actually earlier than any varieties now in use, can only be decided after they have been tried for several years.

LATENESS.

The extension of the strawberry season by the production of good late varieties has also been kept in view and a number of crosses have been made with this object. A late variety crossed with another late variety, a maincrop variety, or a perpetual fruiter, has been found to produce a preponderance of maincrop plants, together with a varying proportion of late seedlings and sometimes a few second-earlies.

The largest proportion of late seedlings has been produced in the following families :—

Laxton's Latest × *The Earl.* Out of 152 plants 22, or possibly more, are late in season.

St. Antoine × *The Earl.* Nine plants out of 38 are late.

Madame Kooi × *Doctor Hogg.* A family of 162 includes 15 or more late seedlings.

Another cross which has given a fair proportion of late seedlings is : *Givon's Late* × *St. Antoine.* Where a late variety and an early one have been crossed the resulting families have consisted largely of maincrop plants, with smaller numbers of late plants and second-earlies. In the case of *Vicomtesse* × *The Earl,* the numbers in a family were approximately four earlies, seven second earlies, 35 maincrops, and 11 lates.

SIZE.

As it is obviously desirable that strawberries should be fairly large, most of the parents used in making crosses have been large-fruited forms, though smaller-fruited varieties have sometimes been used if they possessed some other good quality which it was desired to introduce into the cross. When two large-fruited parents were used a majority of the resulting seedlings usually bore moderate-sized fruit, quite a large proportion bore fruit of fair or large size, and only a small proportion bore small fruit. If one of the parents bore only moderate or small fruit a smaller proportion of the seedlings bore fruit of fair or good size and a larger proportion bore small fruit.

The size of the fruit has in every case been estimated by eye.

The largest proportion of large-fruited seedlings has occurred in the following families :—

Maincrop × *The Laxton.* Six large and 20 fairly large-fruited plants in a family of 62.

Bedford Champion × *King George.* In a family of 235 plants 37 bore large and 29 fairly large fruit.

Scarlet Queen × *King George.* Out of 179 plants 15 bore large and 13 fairly large fruit.

Laxton's Latest × *The Earl.* Eleven large and 15 fairly large-fruited plants out of 152.

Other families which gave a fair proportion of large-fruited plants were : *Maincrop* × *Royal Sovereign, President* × *St. Antoine, Reliance* × *Maincrop, Bedford Champion* × *Maincrop* and *Madame Kooi* × *Doctor Hogg.*

COLOUR.

Observations on the inheritance of colour in the fruit are at present very incomplete, but the information obtained so far points to the following conclusions: A dark crimson fruit crossed with another dark fruit produces either all dark fruits or many dark fruits and a smaller number of lighter coloured fruits. A cross between a dark and a scarlet fruit results in the production of both dark and scarlet fruits by the seedlings (in approximately equal numbers ?); while a dark fruit crossed with a pale pink fruit produces scarlet and pale fruits.

A cross in which both parents are scarlet usually produces dark, scarlet and a few pale fruits, and a scarlet fruit crossed with a pale fruit leads to both scarlet and pale fruits, possibly in about equal numbers. The seedlings from a cross, where both parents have white or very pale pink fruit, all seem to bear similarly pale fruit, and the same result is obtained by self-fertilising a pale-fruited plant, such as White Perpetual. As all gradations of colour from white to a very dark crimson occur in different varieties it is almost impossible to classify the fruits in three or four definite colours. Some scarlet-fruited varieties, when used as parents, seem more disposed than others to throw pale-fruited seedlings; such seems to be the case with King George.

SHAPE.

The shape of the fruit is another rather difficult character to classify, as there are so many intermediates between any fairly definite shapes, such as round, conical, and wedge or coxcomb, which may be chosen. Detailed observations on the shape of the fruits of seedlings have not been made, and usually only a general impression of the fruits of each family has been obtained. Such a general impression leads one to think that the round and conical shapes are in a great measure dominant to the wedge or coxcomb form.

TEXTURE.

In selecting seedlings for further trial much attention is paid to the texture, or in other words the firmness and "carrying" properties, of the berries. No method has yet been employed for judging this except the touch of the fingers. No record has been obtained of the texture of very many of the seedlings, as owing to the limitations of time it has usually only been possible to make observations on those plants which have other qualities which make them worthy of special attention. The only conclusion which can be drawn from the results at present is that a soft-fruited variety, such as White Perpetual, The Queen, or Louis Gauthier, when used as a parent, gives rise to seedlings which all, or nearly all, bear soft fruit. Parents with fruit of moderate texture produce plants with fruit of all degrees of firmness, and this also seems to be the case when firm-fruited parents are used. It has not yet been found that a family of plants from two firm-fruited parents gives a very high proportion of firm fruits. Perhaps the largest proportion of firm fruits yet found have been on the plants from the cross *Maincrop* × *Royal Sovereign.*

FLAVOUR.

This is another character on which comparatively few notes have been made, owing to the fact that during the short time the plants are fruiting it is impossible for one man to taste the fruit from such a large number of plants. Observations on flavour have, therefore, been confined largely to those plants which seem promising in other respects. Possibly in the future detailed notes may be made on the flavour of the fruit from each plant in one or two large families raised for the purpose of finding out something about the inheritance of flavour.

As other breeders of strawberries have noted, the flavour of the fruit of seedlings is very variable, in many cases it is peculiar, and in some cases it is actually unpleasant. Almost every family of seedlings has been found to bear a large proportion of fruit of poor or moderate flavour, while a few plants in each family bear fruit with a good flavour. Very little difference in this respect between different families has yet been detected, but perhaps the largest proportion of good-flavoured fruit has been found in the progeny of *Bedford Champion* × *King George*, *Leader* × *St. Antoine*, and *Fillbasket* × *Bedford Champion.* No general rule indicating the inheritance of such qualities as acidity or sweetness had yet been found. It has, however, been found that the fruits of a large proportion of the seedlings from *The Queen*, *Louis Gauthier*, and *White Perpetual* have a rather sweet, scented, and watery flavour, lacking in acidity. This type of flavour seems to be associated with a fruit which is soft and pale in colour.

FOLIAGE.

It has not yet been found possible to trace definitely the connection between the type of foliage of a family of seedlings and that of their parents, nor has any correlation been found between the type of foliage and the type of fruit, but further notes on these points will be taken. Considering only the number and size of leaves, there are found in each family plants which are distinctly leafy and others which have various smaller quantities of foliage; but as the amount of foliage depends on the general health of the plant too much stress must not be laid on this point, especially as most of the observations so far have been made on only one plant of each seedling variety. There are, however, certain families which are, on the whole, distinctly more leafy than the average, *e.g.*, *The Bedford* × *Keen's Seedling*, *King George* × *Black Prince*, *La Productive* × *Keen's Seedling*, *President* × *Keen's Seedling*, *President* × *St. Antoine*, *Royal Sovereign* × *Keen's Seedling*, *Vicomtesse* × *King George*, *Louis Gauthier* × *Keen's Seedling*. It will be noticed that *Keen's Seedling* is one of the parents in a number of these cases. Very occasionally one of the most leafy plants has been found to be blind, but usually the crops are as good on a very leafy plant as on any other. Possibly, however. extreme leafiness may be detrimental to the crop through shading the fruit and encouraging mildew.

VIGOUR.

As single seedling plants have mainly been under observation so far, and as a single plant may so easily be damaged by some insect or other external agency which may be overlooked, too much emphasis must not be placed on the vigour of the seedlings. Also, as has already been mentioned, the seedlings have not been grown on ground which is quite uniform, and it is suspected that the weakness shown by several complete families is due to soil influence rather than to their constitution. Further, the observations must be understood to apply to Long Ashton conditions of soil and climate, but the same results would not necessarily be obtained in other situations, as it is well known that different varieties of strawberries are definitely suited to different conditions. However. the following observations on vigour in the various families have been made. The families which on the whole were the most vigorous were: *Louis Gauthier* × *Keen's Seedling*, *Scarlet Queen* × *King George*, *Royal Sovereign* × *Keen's Seedling*, *President* × *St. Antoine*, *President* × *Keen's Seedling*, and *La Productive* × *Keen's Seedling*.

The following families consisted mainly of weak plants: *The Queen* × *Reliance*, *The Count* × *President*, *White Perpetual* selfed, *International* × *Laxtonian*, *British Queen* × *Sir J. Paxton*, *Maincrop* × *Bedford Champion*, *Louis Gauthier* × *White Perpetual*, *Reliance* × *Maincrop*.

DISEASE.

The only observations made on diseases up to date have been on the occurrence of mildew (*Sphaerotheca humuli*). No complete record has been kept of attacks of mildew, but every obviously badly mildewed plant was noted. A large proportion, one third to one half, of badly mildewed plants have been found in the following crosses: *Scarlet Queen* × *King George*, *King George* × *Black Prince*, *King George* × *White Perpetual*, *Maincrop* × *Royal Sovereign*, *Maincrop* × *The Laxton*, *La Productive* × *Keen's Seedling*, *President* × *At. Antoine.*

It was also noticed when several families of very young seedlings were being brought on in the greenhouse that the plants from the cross *President* × *British Queen* were all severely attacked by mildew although the other families were free from attack.

No mildew was seen in the families *Vicomtesse* × *The Earl* and *Louis Gauthier* × *White Perpetual*, and only one mildewed plant out of 60 from *Vicomtesse* × *King George*. In several other families very few mildewed plants have been found, but as these plants have been observed for one year only, when mildew was not very prevalent here, no conclusion can yet be drawn regarding resistance to mildew.

SELECTION OF SEEDLINGS.

The main point in the work with the strawberry seedlings up to date has been the selection of plants which show promise of value, and the propagation of them for further trial. Observations made on single plants for two, or at most three years, may be misleading and the true worth of a seedling cannot be estimated until it has been propagated in fairly large numbers and grown for several years. A considerable number of seedlings are selected in the single plant stage, but probably many of them will be eliminated in the next stage of the trial, very few will pass the test of a large scale trial for several years, and the percentage of the seedlings found to be really first-class will be extremely small. By no means all the plants which were noted as good in the various preceding sections of this account have been selected even for the first stage of further trial, for many of them were good only in respect of one or two particular characters. For instance, one really good cropper might be very soft or have a very poor flavour, a very early variety might bear a poor crop of very small fruit, and so on. Seedlings have only been selected for further trial if they appear to be really good in two or three respects and at least fairly good in others.

The numbers of seedlings selected from different families vary greatly and it may be of interest to note the families from which the largest proportion of seedlings have been selected for a first trial on a larger scale.

Bedford Champion × *King George*	17	selected	out of	235.
Scarlet Queen × *King George*	15	,,	,,	179.
Maincrop × *The Laxton*	12	,,	,,	62.
Laxton's Latest × *The Earl*	9	,,	,,	152.
Maincrop × *Royal Sovereign*	8	,,	,,	35.
La Productive × *Keen's Seedling*	8	,,	,,	63.

From many other families between 1 in 15 and 1 in 30 seedlings have been selected, but a large number of families have furnished only 1 or 2 selections, sometimes out of 200 plants. From about 30 families no plants worth selecting have been obtained, but some of these families were quite small.

From a total number of about 5,000 seedlings 145 have been selected for propagation and further trial.

XV —ANNUAL REPORT FOR 1923 OF THE CONSULTING CHEMIST.

(*Dr. J. A. Voelcker, M.A., F.I.C.*).

The number of samples sent by members of the Society during the year was 40, as against 47 sent in 1922.

In addition, there were 54 samples of cider analysed in connection with the Swansea show of the Society, this being rendered necessary owing to the lamented death of the late Mr. F. J. Lloyd, who had for so many years conducted this work.

The samples sent by members were as follows :—

Linseed Cakes	9
Cotton Cakes and Meals	11
Palm-nut Cake	1
Coco-nut Cake	1
Dairy Meals	3
Calf Meal	1
Bean Meal	1
Cones	1
Fish Meal	1

Silage	1
Superphosphates	2
Steamed Bone Flour	1
Compound Manures	2
Kainit	2
Lime	1
Waters	2
	40

LINSEED CAKE.

Of the nine samples sent, four were good and pure. Of the remainder, one was distinctly impure, containing weed seeds and rape seed, and having a decidedly bitter taste. In a second case the sample was not as free from weed seeds as it should have been. In a third, there was a slight excess of sand, viz., 2.22 per cent. In a fourth case, the oil was low, viz., 8.38 per cent, and in the fifth case the price charged (£11 12s. 6d.) was excessive, inasmuch as this quality of cake was, at the time, selling at £10 7s. 6d. per ton.

COTTON CAKES AND MEALS.

One of these was dear, being charged as £8 per ton when the current price was £6 17s. 6d., and one, though up to guaranteed analysis, was not as fresh and bright as it should have been.

PALM-NUT CAKE AND COCO-NUT CAKE.

Samples of these were sent because of pigs fed on them, with other food, having died. Examination of the cakes, however, showed that they were both pure and free from objection.

DAIRY MEALS.

The three samples were all satisfactory, made from suitable materials, and sound in condition.

CALF MEAL.

This was found to be a preparation from partially skimmed milk. The analysis was as follows :—

Fat	6.89
Albuminoids	26.37
Carbohydrates, Water, etc.	60.18
Mineral Matter	6.56
	100.00

BEAN MEAL.

This was a good and pure sample.

OFFALS.

It is somewhat strange, on account of the frequently unsatisfactory nature of wheat and other offals, that only one sample was sent, this being called " Maize and Rice Cones." It was a material practically of carbohydrate nature, and quite suitable for pig-feeding.

FISH MEAL.

The one sample sent, while containing neither oil nor salt in excess, was decidedly dear in price, £22 10s. 0d. on rail being charged for it, whilst the current price was £18 5s. 0d., also on rail.

SILAGE.

The sample sent was a nice, well-made one, it being in no way excessively acid.

SUPERPHOSPHATE.

Of the two samples sent, one was satisfactory, but the other was somewhat lumpy and contained a high percentage of water, viz., 15.53 per cent.

BASIC SLAG AND MINERAL PHOSPHATE.

It is to be commented upon that no samples of these phosphates were sent. In view of the desirability of seeing that Basic Slag and similar phosphatic materials are finely ground, it behoves purchasers to check their deliveries in this respect at least.

STEAMED BONE FLOUR.

The sample sent was of very good quality, the analysis giving 60.81 per cent. of phosphate of lime with close on 1 per cent. of ammonia.

COMPOUND MANURES.

One of these, though called " Compound Manure," was really Lawn Sand, being a mixture of Sulphate of Ammonia with sand and a little organic matter. It was composed practically of 55 parts of Sulphate of Ammonia, 28 parts of sand, and the remainder organic matter

KAINIT.

The two samples of this were good, containing 15.03 per cent. and 16.80 per cent. of Potash respectively.

GROUND LIME.

Only one sample of lime of any kind was sent for analysis, and this proved far from satisfactory, the analysis being as follows :—

Oxide of Iron and Alumina ..	1.09
Lime	66.92
Water, Carbonic Acid, etc. ..	28.73
Silica	3.26
	100.00

A good deal of attention having been drawn to the liming of land and to the need of seeing that the lime supplied is of good quality, it would be well, as instanced by the example here given, for purchasers to ensure that the lime they use is of good quality. A good sample of lime should have quite 80-85 per cent. of lime.

WATERS.

Of the two samples sent, one was a good and pure supply ; the other, though cloudy in appearance, was free from any harmful pollution, and, if filtered to clear it, would make a quite satisfactory source of supply.

APPENDIX.

Bath and West and Southern Counties Society.

SWANSEA MEETING, 1923.

JUDGES.

HORSES.

Shire.—H. W. BISHOP, Pendley Stock Farms, Tring, Herts.

Hunters.—Captain LORD STALBRIDGE, M.F.H., Motcombe House, Shaftesbury, Dorset.

Welsh Cobs.—T. H. VAUGHAN, Caerffynon, Llanerfyl, Welshpool.

Welsh Mountain Ponies.—T. H. VAUGHAN, Caerffynon, Llanerfyl, Welshpool.

Mountain and Moorland Ponies (other than Welsh Mountain)—E. P. NORTHEY, Higher Bowden, Okehampton, Devon.

Any Agricultural Breed.—R. T. BROAD, Home Farm, Merthyr Mawr, Bridgend.

Colliery.—H. H. PHILLIPS, 25, Brynymor Crescent, Swansea.

Saddle.—Captain LORD STALBRIDGE, M.F.H., Motcombe House, Shaftesbury, Dorset.

Harness.—A. W. HICKLING, Wing Old Hall, Rutland.

Jumping.—Lieut.-Col. LORD WYNFORD, D.S.O., Wynford House, Maiden Newton, Dorset.

CATTLE.

Devon.—R. COOK, Crazelowman, Tiverton.

South Devon.—J. COAKER, Wear, Bishopsteignton, Teignmouth.

Shorthorn.—J. D. KEY, Clifton Mill, Rugby.

Dairy Shorthorn.—W. H. HITCH, Elkstone Manor, Colesbourne S.O., Glos.

Hereford.—C. H. MORRIS, Weston Court, Pembridge.

Sussex.—H. B. AMOS, Ripton, Ashford, Kent.

Red Poll.—J. P. MILNE, Lee Lane Farm, Wendlesham, Camberley, Surrey.

Aberdeen-Angus.—J. ROBB, Estate Office, Conholt Park, Andover.

British Friesian.—R. WALLACE, Mardley Bury, Knebworth, Herts.

Welsh Black.—W. JONES, Plasbryn, Llanbedr, Merionethshire.

Jersey Cows and Heifers.—H. PADWICK, Red House, Ashling, Chichester.

Jersey Bulls.—Col. L. G. GISBORNE, Lingen Hall, Brampton, Bryan, Herefordshire.

Guernsey.—G. T. BARHAM, Sudbury Park, Wembley, Middlesex.

Dexter.—E. P. F. SUTTON, Sidmouth Grange, Earley, Berks.

Milk Test.—A. F. SOMERVILLE, Dinder House, Wells, Somerset.

Butter Test.—A. F. SOMERVILLE, Dinder House, Wells, Somerset.

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SHEEP.

Shropshire.—E. C. Tanner, Eyton-on-Severn, Shrewsbury.

Devon Longwoolled.—C. L. Hancock, The Manor House, Cothelstone, Taunton.

Kent or Romney Marsh.—H. Rigden, Etchinghill, Shorncliffe.

Southdown.—H. Paynter, Broadreed, Emsworth, Hants.

Hampshire Down.—G. C. Waters, Burcombe Manor, near Salisbury.

Oxford Down.—W. H. Hitch, Elkstone Manor, Colesbourne S.O., Glos.

Dorset Horn.—J. C. Davy, Yondover, Beaminster, Dorset.

Exmoor Horn.—W. G. Thorne, Higher House, Twitchen, South Molton.

Suffolk.—G. A. Goodchild, Oak House, Great Yeldham, Essex.

Ryeland.—E. Edmunds, Pontygwyndy Road, Caerphilly.

Welsh Mountain.—H. Ellis, Tairmiebion, Bangor, North Wales.

Kerry Hill.—C. S. Williams, Mellington Farm, Churchstoke, Mont.

Black Welsh Mountain.—H. Ellis, Tairmiebion, Bangor, North Wales.

GOATS.

S. Woodiwiss, Graveleys, Great Waltham, Essex.

PIGS.

Berkshire.—Viscount Portman, Buxted Park, Uckfield, Sussex.

Large Black.—J. H. Glover, Cornwood, South Devon.

Large White.—D. W. Gunn, 27, Compton Road, Sherwood, Notts.

Middle White.—J. H. Holland, Peene House, Newington, Folkestone.

Gloucestershire Old Spots.—J. H. White, Bagborough Home Farm, Shepton Mallet.

Wessex Saddleback.—J. Crumpler, Longlands, North Coker, Yeovil.

Welsh.—W. Jones, Pantydefaid, Llandyssul.

Long White Lop-Eared.—W. R. Northmoor, Uppaton, Yelverton, Sth. Devon.

PRODUCE.

Cider.—W. Gaymer, The Pleasaunce, Attleborough, Norfolk.

Cheese.—A. Todd, British Dairy Institute, Reading.

Cream Cheese, Butter and Cream.—Mrs. E. Hughes, Buckland Home Farm, Bwlch, Breconshire.

COMPETITIONS.

Butter-Making.—Miss D. G. Saker, Somerset Farm Institute, Bridgwater.

Milking.—S. J. Knight, Buckingham Lodge, Keynsham, Bristol.

Shoeing.—J. R. R. Coleman, M.R.C.V.S., The Limes, Croft Road, Swindon.

Timbering and Splicing.—J. Dyer Lewis, 21, Hanwell Road, Penarth.

POULTRY.

G. Doble, Royal Ashton Hotel, Taunton (Classes 1 to 22, 49 to 54, and 67 to 71), and

Clem Watson, F.Z.S., Oxley, Watford (Classes 1, 23 to 48 and 55 to 71).

FORESTRY.

Prof. H. A. Pritchard, 76, Castle Street, Cirencester.

PRIZE AWARDS, 1923.

⁂ An animal designated in this list as the "reserve number" is entitled, *conditionally*, to succeed to any Prize that may become vacant in its class by reason of the animal placed above it by the Judges afterwards failing to qualify.

† Animals where not otherwise stated, may be considered to have been bred by the Exhibitor.

Abbreviations Explained :—S., sire ; d., dam ; s.d., sire of dam ; y., year ; m., month ; w., week ; d., day ; R., Reserve ; V.H.C., Very Highly Commended ; H.C.. Highly Commended ; C., Commended.

The Prizes in Classes 32 to 34, 258 and 259, £187 15s. 0d. towards the Prizes in the Horses, Cattle, Sheep and Pig Classes, and the Special Local Prizes, were contributed by or through the Swansea Local Committee.

HORSES.

SHIRE

(Registered or eligible for registration in the Shire Horse Society's Stud Book).

Class 1.—*Shire Mare, in-foal, or with foal at foot.* [4 entries.]

I. (**£15.**)—Dinam Estates Company, Llandinam, Co. Montgomery, bay, **Gleadthorpe Selection** (93269), foaled 1914, bred by T. L. Hollely, Ryecroft, Retford, Notts. ; s Clumber Forest King (27188), d Haughton Bluebell (71060), s d Royal Derby (16922) ; with foal by Harboro Nulli Secundus (33231).

II. (**£10.**)—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, bay **Flower** (88601), foaled 1916, bred by W. H. Smith, St. James Deeping, Market Deeping, Lincs. ; s Edebar (29344), d Bonny, s d Barrow Boss (18498) ; in-foal.

III. (**£3.**)—L. B. Beauchamp, Norton Hall, near Bath, bay, **Chilcompton Daydream,** foaled 1915, bred by E. H. Buncombe, Wellington, Somerset ; s King Cole 7th, d Day Star (70432), s d Calwich Blue (17226) ; with foal by Marden Pater (33356).

SPECIAL LOCAL PRIZE (B).

(*Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan, Pembroke and Carmarthen, the winner of the First Prize in the Open Class not being eligible to compete.—Best Local Exhibit in Class* 1.

I. (**£5.**)—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, bay, **Flower** (88601), foaled 1916, bred by W. H. Smith, St. James Deeping, Market Deeping, Lincs. ; s Edebar (29344), d Bonny, s d Barrow Boss (18498) ; in-foal.

Class 2.—*Shire Filly or Gelding, foaled in* 1922. [9 entries.]

I. (£10.)—Dinam Estates Company, Llandinam, Co. Montgomery, dark brown or black filly, **Hafren Pearl,** bred by D. Davies, M.P., H.F.H., Broneiron, Llandinam, Co. Montgomery; s Hafren Clansman (36607), d Blackhurst Jewel (87422), s d Eaton Nonsuch (27301).

II. (£5.)—W. J. Cumber, Theale, Berks, bay filly, **Theale Crocus,** bred by H. E. Tucker, Steeple Ashton; s Ratcliff Matchless (35995), d Semington Crocus (109899), s d Saxon Draughtsman (31803).

III. (£3.)—W. G. Buchanan, Manor House Farm, Abergavenny, bay filly, **Gobion Betty,** bred by T. Tunnicliffe, Stocks Farm, Uttoxeter ; s Ash Childwick (34508), d Mile House Carrie (104554), s d Catterall Drayman 2nd (33090).

R.—D. Jenkins, Boverton Place, Llantwit Major, bay filly, **Church Farm Princess Childwick,** bred by J. Walley & Sons, Church Farm, Tabley, near Knutsford; s Childwick Champion (22215), d May Princess, s d Babingley Nulli Secundus (26993).

H.C.—J. Richards, Cefn Farm, Bynea, black filly, **Cefn Maid** ; s Blandston Jubitor, d Bynea Hill (102034, Vol. 42), s d Lockinge Manners (16780).—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, black filly, **Crossways Negress** (Vol. 45); s Herontye Goalkeeper (37496), d Orfold Black Girl (79071), s d King of Tandridge (24351).

C.—O. Williams, J.P., bay filly, **Crossways Daybreak 2nd** (Vol. 45) ; s Kerry Secundus (34863), d Crossways Daybreak (107635), s d Champion's Cupbearer (32215).

Class 3.—*Shire Filly or Gelding, foaled in* 1921. [6 entries.]

I. (£10.)—F. Doble, Winterbourne Bassett, Swindon, bay filly, **Wick Lady Clansman** ; s Basildon Clansman (36277), d Wick Bluebell (90972), s d Bardon Forest Hard Lines (25889).

II. (£5.)—L. B. Beauchamp, Norton Hall, near Bath, black filly, **Hazel Carnation** (111872), bred by W. Brown, Compton Martin, near Bristol; s Marden Peter (33356), d King's Harebell (85406), s d King Cole 7th (26351).

III. (£3.)—W. G. Buchanan, Manor House Farm, Abergavenny, bay filly, **Gobion Blissful**; s Babingley Nulli Secundus (26993), d Marden Bliss 3rd (78731), s d Austy Forest King (28035).

R.—J. T. Harries, Garreg Farm, Kidwelly, light bay filly, **Garreg Wonder Lass** ; s Hapton Wonder (34007), d Heathley Lassie (93537), s d Duke's Double (30385).

Class 4.—*Shire Filly or Gelding, foaled in* 1920. [3 entries.]

I. (£10.)—L. B. Beauchamp, Norton Hall, near Bath, bay filly, **Delvey Clansmaid,** bred by E. F. Appleby, Thurleston Grange, Rugby ; s Champion's Clansman (29221), d Daisy (70359), s d Redlynch Forest King (23626).

II. (£5.)—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, bay filly, **Fenny Lady Goalkeeper,** bred by G. Cotterell, Fenny Compton, Leamington; s Champion's Goalkeeper (30296), d Gleadthorpe Queen (84985), s d Mimm's Champion (26462).

III. (**£3.**)—D. Jenkins, Boverton Place, Llanwit Major, bay mare, **Boverton Chessie,** bred by H. W. Boulton, Bowley Gate Farm, Stoke-on-Trent; s Leek Dauntless (31583), d Rock's Legacy (95224), s d Rickford Coming King (27709).

SPECIAL LOCAL PRIZE (*C*).

(*Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan, Pembroke and Carmarthen, the winners of the First Prizes in the Open Classes not being eligible to compete*). *Best Local Exhibit in Classes* 2, 3 *or* 4.

I. (**£5.**)—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, bay, **Flower,** (88601), foaled 1916, bred by W. H. Smith, St. James's Deeping, Market Deeping, Lincs.; s Edebar (29344), d Bonny, s d Barrow Boss (10498), in foal.

MEDAL (*A*).

Given by the Shire Horse Society.

A Gold Medal, or the sum of £10, *for the best Mare or Filly in the Shire Horse Classes, under Condition* 47, *and to the Breeder of the winner under the Condition stated, a prize of* £5.

Medal.—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, bay **Flower** (88601), foaled 1916, bred by W. H. Smith, St. James's Deeping, Market Deeping, Lincs.; s Edebar (29344), d Bonny, s d Barrow Boss (18498), in foal.

R.—D. Jenkins, Boverton Place, Llantwit Major, bay filly, **Church Farm Princess Childwick,** bred by J. Walley & Sons, Church Farm, Tabley, near Knutsford; s Childwick Champion (22215), d May Princess, s d Babingley Nulli Secundus (26993).

Class 5.—*Shire Stallion, foaled in* 1921. [3 entries.]

I. (**£10.**)—W. J. Cumber, Theale, Berks, bay, **Trebystan King** (39048), bred by Captain J. M. Naylor, Leighton Hall, Welshpool; s Theale Lockinge (35246), d Mellington Evergreen (64255), s d Prospect Prince Albert (21772).

II. (**£5.**)—O. Williams, J.P., Crossways, near Cowbridge, Glamorgan, brown, **Crossways Friar** (Vol. 44; s Monk's Green Friar (35891), d Orfold Black Girl (79071), s d King of Tandridge (24351).

III. (**£3.**)—D. Jenkins, Boverton Place, Llantwit Major, bay, **Bowden Clansman,** bred by J. Bradford, Brook Farm, Ogden; s Homing Clansman, d Brook Vale Dinah (80694), s d Matchless Forest King (31644).

Class 6.—*Shire Colt, foaled in* 1922. [2 entries.]

I. (**£10.**)—W. J. Cumber, Theale, Berks, brown, **Theale Valesman** (Vol. 45), bred by D. W. Lewis, Godstone; s Theale Champion (31879), d Brook Vale Bonny Lass (97266), s d Ratcliffe Prime Minister (31766).

SPECIAL LOCAL PRIZE (D).

(Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan and Pembroke, the winners of the First Prizes in the Open Classes not being eligible to compete). Best Local Exhibit in Classes 5 *or* 6.

I. (£5.)—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, brown, **Crossways Friar** (Vol. 44); s Monk's Green Friar (35891), d Orfold Black Girl (79071), s d King of Tandridge (24351).

R.—D. JENKINS, Boverton Place, Llantwit Major, bay, **Bowden Clansman,** bred by J. Bradford, Brook Farm, Ogden; s Homing Clansman, d Brook Vale Dinah (80694), s d Matchless Forest King (31644).

HUNTERS.

CLASS 10.—*Hunter Mare, in-Foal, or with Foal at foot.* [3 entries].

I. (£15.)—T. G. PHELPS, Cresselly, Kilgetty, Pem., chestnut, **Curacoa,** aged (see H.B.), bred by McLloyd Price, Bryn Cothi, Carmarthenshire; s Curable, s d Lord Byron; with foal by Scipio.

II. (£10.)—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, bay, **Maid Marion,** foaled 1905, bred by P. J. O'Connor; s Little John, d The Only One, s d Laveno; with foal by Great Surprise.

MEDAL (H).

GIVEN BY THE HUNTERS' IMPROVEMENT AND NATIONAL LIGHT HORSE BREEDING SOCIETY, UNDER CONDITIONS 48 AND 49.

A Gold Medal, or £5 and a Bronze Medal, for the best Hunter Brood Mare in Class 10, *registered with a number in the Hunter Stud Book at the time of entry or within a month of the award, not having previously won the above-named Society's Gold Medal as a Brood Mare in* 1923, *and which must have her foal at foot, or produce a living foal in* 1923 *to a thoroughbred horse or Registered Hunter sire. In the second instance a certificate to that effect must be forwarded before the Medal is sent.*

Medal.—T. G. PHELPS, Cresselly, Kilgetty, Pem., chestnut, **Curacoa,** aged (see H.B.), bred by McLloyd Price, Bryn, Cothi, Carmarthenshire; s Curable, s d Lord Byron; with foal by Scipio.

R.—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, bay, **Maid Marion,** foaled 1905, bred by P. J. O'Connor; s Little John, d The Only One, s d Laveno; with foal by Great Surprise.

SPECIAL LOCAL PRIZE (E).

(Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan, Pembroke and Carmarthen, the winners of the First Prize in the Open Class not being eligible to compete). Best Local Exhibit in Class 10.

I. (£5.)—T. G. PHELPS, Cresselly, Kilgetty, Pem., chestnut, **Curacoa,** aged (see H.B.), bred by McLloyd Price, Bryn Cothi, Carmarthenshire; s Curable, s d Lord Byron; with foal by Scipio.

CLASS 11.—*Hunter Filly or Gelding, foaled in* 1922. [4 entries.]

I. (£10.)—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, bay or brown colt, bred by D. Davies, M.P., M.F.H., Llandinam, Co. Montgomery; s Bachelor's Charm, d Judith.

II. (£5.)—MAJOR E. M. WATTS, Eastwood Park, Falfield, Glos., chestnut filly, **Lady Member**; s Political, d Flannelette, s d Hunty Gowk.

III. (£3.)—J. HOLMES, Penyfai, Llanelly, chestnut filly, **Penyfai Sunshine**; s King Edgar, d Miss Buckley, s d Walmsgate.

CLASS 12.—*Hunter Filly, Colt or Gelding, foaled in* 1921. [7 entries.]

I. (£10.)—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, bay gelding, **Abner**, bred by D. Davies, M.P., M.F.H., Broneinon, Llandinam, Co. Montgomery; s Bachelor's Omage, d Judith.

II. (£5.)—MAJOR W. H. WEBB, Spring Grove, Bewdley, bay horse, **Gay Lassie 3rd**, bred by R. P. Cawsey, Huntshaw, Torrington; s Gay Lallie, d Princess 13th (5949).

III. (£3.)—MRS. OWEN WILLIAMS, Crossways, Cowbridge, chestnut filly, **Princess**, bred by Lieut.-Col. D. Davies, M.F.H., Llandinam; s Bachelor's Image, d Lottery.

R.—H. L. STOREY, The Manor House, Malmesbury, chestnut filly, **Moonshine**, bred by Miss A. Hick, Mytton Hall, Whalley; s Moonlighter, d Mary Hamilton, s d Manor Hamilton.

H.C.—MAJOR E. M. WATTS, Eastwood Park, Falfield, Glos., black filly, **Tatters**; s Ragged Robin, d Eva III., s d Travelling Lad.

CLASS 13.—*Hunter Filly or Gelding, foaled in* 1920. [3 entries.]

I. (£10.)—MAJOR W. H. WEBB, Spring Grove, Bewdley, chestnut gelding, **Rocklight**, bred by W. Yeo, Newton Tracey, Barnstaple; s Captain Rush, d Deep Sea.

II. (£5.)—LADY DURAND, Hill House, Bridstow, Ross-on-Wye, chestnut filly, **Droplight**, bred by T. E. Spencer, Church Farm, Radway; s Chanteur, d Kitty 13th.

SPECIAL LOCAL PRIZE (F).

(*Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan, Pembroke, and Carmarthen, the winners of First Prizes in the Open Classes not being eligible to compete*). *Best Local Exhibit in Classes* 11, 12 *and* 13.

I. (£5.)—MRS. OWEN WILLIAMS, Crossways, Cowbridge, chestnut filly, **Princess**, bred by Lieut.-Col. D. Davies, M.F.H., Llandinam; s Bachelor's Image, d Lottery.

R.—J. STAIEN, Coed Hills Stud Farm, St. Hilary, near Cowbridge, Glam., dark brown filly, **Friction**, bred by Mrs. M. Aiken, Garden Cottage, Cheiveley, near Newbury; s Jingling Geordie, d Sensation, s Senseless.

CLASS 14.—*Hunter Mare or Gelding, foaled before* 1920, *that had not won a prize of* £10 *or over under saddle at any Show held previous to March* 24*th*, 1923, *to carry under* 14 *stone.* [5 entries.]

I. (£10.)—E. G. I. PYKE-NOTT and CAPTAIN RUPERT HIGGINS, Haines Hill, Taunton, bay gelding, **Marton**, foaled 1917, bred by J. Brown, The Common, Kirbymoorside ; s Fealsham, s d Red Eagle.

II. (£5.)—THE LADY TERRINGTON, Spinfield, Marlow, Bucks, grey gelding, **Pharoah**, foaled 1917 ; s Lord Carbine, d Tempest.

III. (£3.)—J. HOLMES, Panyfai, Llanelly, chestnut mare, **Penyfai Victory**, foaled 1919, bred by J. Williams, Aydrein, Carmarthenshire ; s Scipio, d Miss Buckley, s d Walmsgate.

CLASS 15.—*Hunter Mare or Gelding, foaled before* 1920, *that had not won a Prize of* £10 *or over under saddle at any Show held previous to March* 24*th*, 1923, *to carry* 14 *stone and over.* [4 entries.]

I. (£10.)—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, chestnut gelding, **Royal Scot** ; s Flying Scot, d Opera, s d Passorubles.

II. (£5.)—W. L. EVERARD, Ratcliffe Hall, Leicestershire, chestnut gelding, **Boydie** (441), foaled 1917, bred by M. Birkbeck, Poringland, Norwich ; s Gateboy (183), d Czarina 2nd (4074), s d Chatsworth.

CLASS 16.—*Hunter Mare or Gelding, foaled in* 1919, *to carry* 14 *stone and over.* [1 entry.]

I. (£10.)—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, bay gelding, **Dalesman**, bred by J. Pearson, Rosedale, Pickering, Yorks ; s Blacksmith, s d Bradgate.

CLASS 17.—*Hunter Mare or Gelding, foaled in* 1919, *to carry under* 14 *stone.* [2 entries.]

I. (£10.)— E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, bay mare, **Gabrielle 2nd** (5803), bred by W. Lofthouse, Bishopthorpe, York ; Tantamount, d Gilliver (6014), s d Curfew.

CLASS 18.—*Hunter Mare or Gelding, foaled before* 1920, *to carry under* 14 *stone.* [9 entries.]

I. (£20.)—J. K. STEVENSON, The Chase, Upper Welland, Malvern Wells, Worcs., black gelding, **Best Man**, 5y., bred by G. Harrison, Cirencester ; s The Best.

II. (£10.)—J. HOLMES, Penyfai, Llanelly, bay gelding, **Penyfai Huntsman**, foaled 1917, bred by J. Williams, Mydrim, Carmarthenshire ; s Sysonby, d Miss Buckley, s d Walmsgate.

III. (£3.)—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, bay gelding, **Dalesman**, bred by J. Pearson, Rosedale, Pickering, York ; s d Blacksmith, s d Bradgate.

R.—E. G. I. PYKE-NOTT and CAPTAIN RUPERT HIGGINS, bay gelding, **Marton**, foaled 1917, bred by J. Brown, The Common, Kirbymoorside; s Fealsham, s d Red Eagle.

H.C.—MAJOR W. H. WEBB, Spring Grove, Bewdley, brown gelding, **Bracklyn.**

CLASS 19.—*Hunter Mare or Gelding, foaled before* 1920, *to carry* 14 *stone or over.* [10 entries.]

I. (£20.)—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, chestnut gelding, **Royal Scot**; s Flying Scot, d Opera, s d Passorubles.

II. (£10.)—A. MASTERS, 29, St. Mary Street, Cardiff, bay gelding, **Jack,** foaled 1917; s Woodrooff, d Clonmel, s d Ireland.

III. (£3.)—LORD GLANELY, Lackham, Lacock, Wilts, chestnut gelding, **Dreadnought,** foaled 1918, bred by M. Wilson, Didmarton, Badminton; s John Lambton, s d Red Prince 2nd.

R.—W. L. EVERARD, Ratcliffe Hall, Leicestershire, chestnut gelding, **Boydie** (441), foaled 1917, bred by M. Birkbeck, Poringland, Norwich; s Gateboy (183), d Czarina 2nd (4074), s d Chatsworth.

H.C.—MAJOR W. H. WEBB, Spring Grove, Bewdley, chestnut gelding, **Tipperary,** foaled 1913.

CLASS 20.—*Hunter Selling Class—Mare or Gelding, three years old or over.* [1 entry.]

[NO AWARD.]

SPECIAL LOCAL PRIZE (*G*).

(*Open only to Residents in the Counties of Brecon, Cardigan, Radnor, Glamorgan, Pembroke and Carmarthen, the winners of First Prizes in the Open Classes not being eligible to compete*). *Best Local Exhibit in Classes* 13 *to* 20.

The Silver Cup was given by Major Dd. Davies, M.P., Llandinam, under the following conditions:—

> The Cup to be won three times before becoming the property of the holder. The winner in this Class will be required to find two guarantors approved by the Committee of the Swansea Horse Show Society, for the safe return of the Cup to the Secretary before July 1st, 1924, for competition at the next Show.

Silver Cup.—A. MASTERS, 29, St. Mary Street, Cardiff, bay gelding, Jack, foaled 1917; s Woodrooff, d Clonmel, s d Ireland.

MEDAL (I).

GIVEN BY THE HUNTERS' IMPROVEMENT AND NATIONAL LIGHT HORSE BREEDING SOCIETY, UNDER CONDITIONS 48 AND 49.

A Silver Medal, or £1 (at the option of the winner), for the best Hunter Mare or Gelding of any age, exhibited by a member of the Hunters' Improvement and National Light Horse Breeding Society, in Classes 14 *to* 20, *whose subscription to that Society must be paid within a month of the award. Only Prize-winners in the Classes were eligible for these Medals.*

Medal.—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, bay mare, **Gabrielle 2nd** (5803), bred by W. Lofthouse, Bishopthorpe, York; s Tantamount, d Gulliver (6014), s d Curfew.

R.—J. HOLMES, Penyfai, Llanelly, bay gelding, **Penyfai Huntsman,** foaled 1917, bred by J. Williams, Mydrim, Carmarthenshire; s Sysonby, d Miss Buckley, s d Walmsgate.

WELSH COBS.

CLASS 21.—*Welsh Cob Mare, in-foal or with foal at foot.* [2 entries.]

I. (£5.)—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, Mont., bay, **Llwyn Jewel** (7163), foaled 1919; s Mathyrofal Eiddwen (965), d Llyssum Ilid (4755), s d Idloes Flyer; with foal by Llwyn Coming King.

II. (£3.)—D. KNEATH, Erwfawr, Three Crosses, Dunvant, Glam., brown, **Caradog Bess** (4976), foaled 1909, bred by D. Davies, Gilfacheven, Brechfa, Carm.; s Caradog Flyer (379).

CLASS 22.—*Welsh Cob Barren Mare or Gelding any height to be shown in hand.* [6 entries.]

I. (£8.)—T. DAVIES & Co., Llechwedd and Pontfaen, Lampeter, bay, **Pontfaen Lady Model** (7203), foaled 1917; s Welsh Model (620), d Lady Gwenog 3rd (3064), s d Dieham Confidence (109).

II. (£5.)—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, Mont., dun, **Hwylog Peggy** (5843), foaled 1916, bred by R. Rowland, Cwmhwylog, New Cross, Aberystwith; s Trotting Jack (528), d Hwylog Shan (5317).

III. (£2.)—F. GAMBOLD, 51, Rhondda Street, Swansea, bay gelding, **Welsh Lad,** foaled 1918, bred by — Thomas, Carmarthen; s High Stepping Gambler, d Davy, s d Allway.

R.—F. F. MASON, The Faraam, Killay, Glamorganshire, chestnut mare, **Faraam Abbess.**

CLASS 23.—*Welsh Cob Stallion, exceeding* 14.2 *hands.* [4 entries.]

I. (£10.)—W. B. HARRIES & SON, Penygraig-yr-Ostyn, Conwil Elfed, Carmarthenshire, brown, **Deinol Comet** (919 W.C. & P.S.B.), foaled 1911, bred by D. Morris, Deinol Farm, Henllan, Cardiganshire; s Briton Flyer (622 W.C. & P.S.B.), d Blossom (877 W.C. & P.S.B.), d Odwyn Comet.

II. (£5.)—T. M. Williams, Brechfa, Clynderwen, bay, **Brechfa Briton Comet,** foaled 1919, bred by J. Evans, Blitherton; s Brechfa Briton Flyer, d Polly Briton, s d Brechfa Flyer.

III. (£3.)—Mrs. E. Hughes, Cefncoch Stud Farm, Ryhdyfin, near Aberystwith, bay, black points, **Vyrnwy Flyer,** foaled 1914, bred by D. Jones, Neuaddcynhinfa, Llangyniew, Welshpool, Mont.; s King Flyer (35 W.S.B.), d Bess of Neuad (4324 W.S.B.), s d Welsh Flyer (111).

Class 24.—*Welsh Cob Stallion not exceeding* 14.2 *hands.* [2 entries.]

[No Award.]

SPECIAL PRIZE (J).

Given by the Welsh Pony and Cob Society under the Conditions Stated.

A Silver Medal and Illustrated Certificate for the best Stallion, Mare, Filly or Filly Foal in Classes 21 *to* 24.

Medal—W. B. Harries & Son, Penygraig-yr-Ostyn, Conwil Elfed, Carmarthenshire, brown, **Deinol Comet** (919 W.C. & P.S.B.), foaled 1911, bred by D. Morris, Deinol Farm, Henllan, Cardiganshire; s Briton Flyer (622 W.C. & P.S.B.), d Blossom (877 W.C. & P.S.B.), d Odwyn Comet.

R.—T. Davies & Co., Llechwedd and Pontfaen, Lampeter, bay, **Pontfaen Lady Model** (7203), foaled 1917; s Welsh Model (620), d Lady Gwenog 3rd (3064), s d Dieham Confidence (109).

WELSH MOUNTAIN PONIES.

Class 25.—*Welsh Mountain Pony Brood Mare, foaled in or before* 1919, *not exceeding* 12.2 *hands, neither docked nor hogged, in-foal or with foal at foot, and must produce a foal in* 1923 *before receiving a prize.* [9 entries.]

I. (£10.)—D. Davies, Blaenpistyll, Cardigan, grey, **Pistyll Limestone** (5182), foaled 1916, bred by Mrs. Green, The Grove, Craven Arms; s Bleddfa Shooting Star (73 W.P.S.C.), d Emlyn Grey Star (3002), s d Dyoll Starlight; in foal.

II. (£5.)—E. Griffiths, Penygraig, Abergwili, Carmarthen, light grey, **Myrddin Star,** foaled 1915; s Shooting Star; with foal by King Cole 2nd.

III. (£3.)—Mrs. H. D. Greene, Grove, Craven Arms, Salop, cream, **Grove Marigold** (3303 W.S.B.), foaled 1910; s Cledan Flyer (370), d Grove Myrtle (2857), s d Lion Express; with foal by Ch. Grove King Cole 2nd (565).

R.—H. Thomas, Pwll Bach, Dufen, Llanelly, grey, **Little Doris,** foaled 1915, bred by W. D. Williams, Blaen-Twrch Farm, Cardigan; s Champion Starlight, d Dolly Grey.

H.C.—Mrs. J. F. Thomas, Homeland, Pembrey, bay, **Tabiatha,** foaled 1914, bred by E. Jones, Manoravon, Llandilo; s Champion Greylight, d Bettyfach, s d Cymryfydd; in foal.

C.—Lord Swansea, D.S.O., M.V.O., Caer Beris, Builth Wells, black, **Mathrafal Ritaway**, foaled 1916, bred by H. M. Jones, Mathrafal, Meifod, Mont.; s Mathrafal Cupid (646 W.S.B.), d Llyssum Nell ddu (4615 W.S.B.), s d Trannon Hero (9 W.S.B.); with foal by Mathrafal Wampus (1066 W.S.B.).

Class 26.—*Welsh Mountain Pony Barren Mare or Gelding, not exceeding* 12.2 *hands, to be shown in hand.* [6 entries.]

I. (**£5.**)—Major W. M. Dugdale, Llwyn, Llanfyllin, Mont., roan mare, **Llwyn Coralie** (5205), foaled 1913; s Llwyn Cymro (407), d Llwyn Gem (4129), s d Llwyn Tyrant.

II. (**£3.**)—J. H. Jones, Nantlowrog, Clydach, Swansea, dark bay, **Eppynt Flash Light**, foaled 1917, bred by — Miller, Forest Lodge, Brecon.

III. (**£2.**)—F. F. Mason, The Faraam, Killay, Glamorgan, black mare, **Faraam Mary Watkins**, foaled 1917.

R.—I. L. Passmore, 13, Jericho Road, Kilvey, Swansea, grey mare, **Mary Fach**, foaled 1917.

Class 27.—*Welsh Mountain Pony Stallion, foaled in or before* 1919, *not exceeding* 12.2 *hands, and neither docked nor hogged.* [6 entries.]

I. (**£10.**)—Major W. M. Dugdale, Llwyn, Llanfyllin, Mont., grey, **Kilhendre Celtic Silverlight** (953), foaled 1916, bred by Miss Chapman, Kilhendre, Ellesmere; s Shooting Star (73), d Grove Apricot (4421).

II. (**£5.**)—Mrs. H. D. Greene, Grove, Craven Arms, Salop, grey, **Grove King Cole 2nd** (565), foaled 1911; s Grove King Cole (197), d Bleddfa Tell Tale (943), s d Tyrant.

III. (**£3.**)—F. F. Mason, The Faraam, Killay, Glamorgan, grey, **Bwlch Quicksilver**, foaled 1910, bred by L. Morgan, Abergwili; s Dyoll Starlight (4), d Lady Greylight (2046), s d Greylight (80).

R.—W. J. Jackett, Ystalyfera, Swansea Valley, grey, **Tawe Valley Ballistite** (992 W.S.B.), foaled 1916, bred by —Williams, Llwyn Moch Farm, Cwmllynfell; s Grove Ballistite (200 W.S.B.), d Llwyn Flower Maid (4097 W.S.B.), s d Eeddwyn Flyer (11).

H.C.—Jones Bros., Morlais Welsh Pony Stud, Dowlais, Glam., grey, **Morlais Searchlight**, foaled 1918; s Morlais Dazzler (740), d Morlais Twilight (4922), s d Dyoll Starlight (4).

C.—E. Williams & Son, Llwyn Ddewi, Capel Dewi, Carmarthen chestnut, **Dewi Dyol**, foaled 1917; s Dyol Starlight, d Lady Dewi, s d Skylight.

Class 28.—*Welsh Mountain Pony Filly or Colt, foaled in* 1920, *not exceeding* 11.3 *hands, or in* 1921, *not exceeding* 11.2 *hands.* [10 entries.]

I. (**£6.**)—T. H. Davies, Coedstone, Llangadock, bay, **Shone Heather**; s Kismet, d Shone Marvel (6061), s d Forest Rocket (391).

II. (**£4.**)—D. Davies & Son, Blaen Pistyll, Cardigan, grey, **Laddier Dre**; s Merlyn of Pistyll (935), d Pistyll Limestone (5182), s d Bleddfa Shooting Star (73).

III. (**£2.**)—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, grey, **Llwyn White Cora**; s Llwyn Little Wonder (905), d Llwyn Coralie (5205), s d Llwyn Cymro (407).

R.—F. F. MASON, The Faraam, Killay, Glamorgan, dark grey, **Faraam Constellation** (1101), foaled 1920, bred by — Rowe, Strefford, Craven Arms, Salop; s Shooting Star (73), d Grove Stella, s d Grove Ballistite (200).

V.H.C.—W. T. LOOKER, Brynnewydd, Penyrheol Gorseinon, silver grey colt, **Seldom Seen,** foaled 1921, bred by W. B. Edwards, Glan-y-felyn Mews, Gorseinon; s Irfon Talisman, d Irfon Marvel.

H.C.—MAJOR W. M. DUGDALE, chestnut filly, **Llwyn Lightfoot,** foaled 1921; s Llwyn Cadet (955), d Lady Lightfoot (2902), s d Gwyndy Cymro (154).

C.—MRS. H. D. GREENE, Grove, Craven Arms, Salop, brown filly, **Grove Ladybird,** foaled 1921; s Ch. Shooting Star (73), d Lady Grey (3480), s d Beulah Light (282).

CLASS 29.—*Welsh Mountain Pony Filly or Colt, foaled in* 1922. [7 entries.]

I. (**£5.**)—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, Mont., grey filly, **Llwyn Sylvia**; s Kilhendre Celtic Silverlight (953), d Llwyn Marigold (5545).

II. (**£3.**)—G. J. THOMAS, Carreg Cegin, Llandilo, brown filly, **Mynyddes,** bred by A. Thomas, Capel Tydist; s Capel Ranger (1055), d Myfawny, s d Welsh Diamond 2nd (264).

III. (**£2.**)—MRS. H. D. GREENE, Grove, Craven Arms, Salop, grey colt, **Grove Poacher**; s Ch. Shooting Star (73), d Grove Twilight (3017), s d Grove Ballistite (200).

R.—F. F. MASON, The Faraam, Killay, Glamorgan, brown filly, **Faraam Black Cloud**; s Grove Grey Dawn (893), d Clumber Blacky (3757), s d Linnel Don.

H.C.—MRS. J. F. THOMAS, Homeland, Pembrey, chestnut filly, **Pembrey Sage,** bred by J. F. Thomas, Towfu; s Starlight, d Tabiatha, s d Champion Greylight.

SPECIAL PRIZE (*K*).

GIVEN BY THE WELSH PONY AND COB SOCIETY, UNDER THE CONDITIONS STATED.

A Silver Medal and Illustrated Certificate for the best Stallion, Mare, Filly or Filly foal in Classes 25 *to* 29.

Medal.—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, Mont., grey, **Kilhendre Celtic Silverlight** (953), foaled 1916, bred by Miss Chapman, Kilhendre, Ellesmere; s Shooting Star (73), d Grove Apricot (4421).

R.—D. DAVIES, Blaenpistyll, Cardigan, grey, **Pistyll Limestone** (5182), foaled 1916, bred by Mrs. Green, The Grove, Craven Arms; s Bleddfa Shooting Star (73 W.P.S.C.), d Emlyn Grey Star (3002), s d Dyoll Starlight; in foal.

MOUNTAIN AND MOORLAND PONIES
(other than Welsh Mountain).

CLASS 30.—*Mountain or Moorland Pony Mare, not exceeding* 13 *hands, in-foal, or with foal at foot.* [1 entry.]

[NO AWARD.]

CLASS 31.—*Mountain or Moorland Pony Stallion, no exceeding* 13 *hands.* [1 entry.]

I. (**£10.**)—MISS CALMADY-HAMLYN, M.B.E., J.P., Pearroc Vean, Buckfast, South Devon, bay, **The Leat** (1068 N.P.S.S.B.), foaled 1918, bred by H.R.H. The Prince of Wales, K.G., Duchy of Cornwall; s Dwarka, d Dartmoor.

ANY AGRICULTURAL BREED.

CLASS 32.—*Mare or Gelding, foaled before* 1921, *suitable for general work and the property of a resident within* 20 *miles of Swansea, shown in hand without gear, on the third day of the Show.* [3 entries.]

I. (**£5.**)—F. F. MASON, The Faraam, Killay, Glam., bay gelding, **Lord Chesterfield.**

II. (**£2.**)—D. JOSEPH, Brynafer Farm, Parkmill, Glam., dark bay filly.

III. (**£1.**)—F. F. MASON, bay gelding, **Lord Coventry.**

COLLIERY.

CLASS 33.—*Mare or Gelding, over* 14.2 *and not over* 15.1 *hands, that had been worked underground in a colliery for at least three months, previous to May* 1*st*, 1923. *Exhibited in gear on the fourth day of the Show.* [4 entries.]

I. (**£7.**)—LEWIS MERTHYR CONSOLIDATED COLLIERIES, Trehafod, bay gelding, **Forest King.**

II. (**£5.**)—CAMBRIAN COLLIERIES, LTD., Clydach Vale, Rhondda, bay gelding, **Victor.**

III. (**£3.**)—BLAINA COLLIERY CO., LTD., Gloucester House, Swansea, **Monarch.**

IV. (**£1.**)—HILLS PLYMOUTH CO., LTD., Merthyr Tydvil, **Sovereign.**

CLASS 34.—*Mare or Gelding, not exceeding* 14.2 *hands, that had been worked underground in a colliery for at least three months previous to May* 1*st*, 1923. *Exhibited in gear on the fourth day of the Show.* [6 entries.]

I. (**£7.**)—WELSH NAVIGATION STEAM COAL COL, LTD., Coedely, Tonyrefail, black gelding, **Sir David.**

II. (**£5.**)—LEWIS MERTHYR CONSOLIDATED COLLIERIES, Trehafod, black gelding, **Cockney.**

III. (**£3.**)—CLEEVES WESTERN VALLEYS ANTHRACITE COLLIERIES, LTD., New Cross Hands Collieries, Llanelly, bay, **Charlie.**

IV. (**£1.**)—CLEEVES WESTERN VALLEYS ANTHRACITE COLLIERIES, LTD., bay, **Emperor.**

SPECIAL PRIZES.

For Hauliers in charge of animals entered in Classes 33 *and* 34, *who turned out the best conditioned horses and the general turnout of which was the neatest and best, the Horses being paraded in gear after the Classes had been judged.*

I. (**£1.**)—BLAINA COLLIERY CO., LTD., Gloucester House, Swansea, **Monarch.**

II. (**10s.**)—LEWIS MERTHYR CONSOLIDATED COLLIERIES, Trehafod, black gelding, **Cockney.**

III. (**5s.**)—HILLS PLYMOUTH CO., LTD., Merthyr Tydvil, **Sovereign.**

R.—LEWIS MERTHYR CONSOLIDATED COLLIERIES, LTD., bay gelding, **Forest King.**

SADDLE.

CLASS 35.—*Mare or Gelding, any height, for riding purposes, ridden on the second day of the Show.* [10 entries.]

I. (**£10.**)—E. G. I. PYKE-NOTT and CAPTAIN R. HIGGINS, Haines Hill, Taunton, chestnut gelding, **Royal Scot.**

II. (**£5.**)—J. HOLMES, Penyfai, Llanelly, bay gelding, **Huntsman.**

III. (**£2.**)—R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, bay gelding, **Bright Idea.**

R.—W. L. EVERARD, Ratcliffe Hall, Leicestershire, bay mare, **Perfection.**

H.C.—LADY DURAND, Hill House, Bridstow, Ross-on-Wye, chestnut mare, **Searchlight of Bridstow.**

CLASS 36.—*Pony, not over* 12.2 *hands suitable for and ridden by a child not over* 13 *years of age, on the third day of the Show.* [4 entries.]

(A Whip was presented to the best Boy and Girl Riders in this Class.)

I. (**£5.**)—LADY K. E. EDWARDS, Hendrefoilan, Sketty, strawberry roan, **Primrose.**

II. (**£4.**)—F. F. MASON, The Faraam, Killay, Glamorgan, black mare, **Faraam Mary Watkins.**

III. (**2.**)—JONES BROS., Morlais Welsh Pony Stud, Dowlais, bay mare, **Morlais Gipsy Girl** (6387).

CLASS 37.—*Pony, not over* 14 *hands, suitable for and ridden by a child not over* 15 *years of age, on the fourth day of the Show.* [5 entries.]

(A Whip was presented to the best Boy and Girl Riders in this Class).

I. (**£5.**)—JONES BROS., Morlais Welsh Pony Stud, Dowlais, bay mare, **Morlais Gipsy Girl.**

II. (**£4.**)—J. PYE, Eden Avenue, Swansea, cheatnut mare, **Lady.**

III. (**£2.**)—J. LETHABY, 1, Eversley Road, Skotty, Swansea, dark chestnut, **Daisy** (6387).

CLASS 38.—*Weight-carrying Cob, not over* 15 *hands, to carry not less than* 14 *stone, ridden on the third day of the Show.* [9 entries.]

I. (**£10.**)—R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, chestnut gelding, **Pure Gold.**

II. (**£5.**)—L. LLEWELLYN JONES, Newlog, Bishops Hall, Taunton, gelding, **Splash.**

III. (**£2.**)—R. JONES, Coverside, 153, St. Helen's Road, Swansea, gelding, **Pistyll Pride.**

R.—W. WILLIAMS, Llwynpiod, Carmarthen, chestnut mare, **Sunlight.**

V.H.C.—MAJOR W. M. DUGDALE, Llwyn, Llanfyllin, chestnut gelding, **Llwyn Dandy.**

H.C.—F. F. MASON, The Faraam, Killay, Glam., chestnut mare, **Faraam Abbess.**

CLASS 39.—*Mare or Gelding, not over* 14.2 *hands, ridden on the fourth day of the Show.* [8 entries.]

I. (**£10.**)—LADY DURAND, Hill House, Bridstowm Ross-on-Wye, chestnut, **Searchlight of Bridstow.**

II. (**£5.**)—W. L. EVERARD, Ratcliffe Hall, Leicestershire, bay mare, **Perfection.**

III. (**£2.**)—R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, brown mare, **Laughing Water.**

R.—D. F. WYLIE, Reabrook, Munsterley, Shrewsbury, brown mare, **Brenda.**

CLASS 40.—*Mare or Gelding, over* 13.2 *and not over* 15 *hands, made or unmade, ridden on the fifth day of the Show.* [11 entries.]

I. (**£10.**)—D. F. WYLIE, Reabrook, Munsterley, Shrewsbury, black mare, **Zara.**

II. (**£5.**)—W. L. EVERARD, Ratcliffe Hall, Leicestershire, bay mare, **Perfection.**

III. (**£2.**)—R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, bay gelding, **Bright Idea.**

R.—CAPT. H. PRICE JONES, Manoravon, Llandilo: **The Friar.**

HARNESS.

CLASS 41.—(*Novice Class*). *Mare or Gelding, over* 14 *hands, that had not previously won a prize of* £10 *or over, driven on the first day of the Show.* [8 entries.]

I. (£7.)—T. EVANS, Danycoed, Blackpill, Glam., bay gelding, **Senator.**

II. (£4.)—W. G. DAVIES, 72, Victoria Avenue, Porthcawl, brown mare, **Fulmer Patricia.**

III. (£2.)—G. SHEPPARD, 18, Chepstow Road, Newport, Mon., chestnut mare, **Axholme Elegance.**

R.—W. SAMUEL, St. Cadog Dairy, Swansea, chestnut gelding, **Mortimer.**

H.C.—W. THOMAS, 14, New Orchard Street, Swansea, dark bay mare, **Whitsun Horace.**

C.—RICHARDS BROS., Greenland Stud, Glanamman, chestnut gelding, **Macado.**

CLASS 42.—(*Novice Class*). *Mare or Gelding, not over* 14 *hands, that had not previously won a prize of* £10 *or over, driven on the first day of the Show.* [5 entries.]

I. (£7.)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown gelding, **Cestrian Furious** (9283).

II. (£4.)—J. DAVIES, Brynheulog, Birch Grove, Llansamlet, Swansea, bay, **Tanyralt Mascot.**

III. (£2.)—W. G. DAVIES, 72, Victoria Avenue, Porthcawl, dark chestnut, **Tanyralt M. Horatio.**

R.—J. PYE, Eden Avenue, Swansea, chestnut mare, **Lady.**

CLASS 43.—*Mare or Gelding,* 13.2 *and under* 14.2 *hands, driven on the second day of the Show.* [4 entries.]

I. (£15.)—D. REES JONES, Penbryn Stud, Aberdare, **Penbryn Marietta.**

II. (£8.)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown gelding, **Melbourne Mark** (G 90).

III. (£4.)—G. SHEPPARD, 18, Chepstow Road, Newport, Mon., chestnut gelding, **Signet.**

R.—D. HARRIS, Llandebie Stud, Llandebie, bay gelding, **Adonis.**

CLASS 44.—*Mare or Gelding,* 14.2 *hands or over, driven on the second day of the Show.* [3 entries.]

I. (£15.)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, chestnut gelding, **Cestrian Rambler.**

II. (£8.)—G. SHEPPARD, 18, Chepstow Road, Newport, Mon., bay gelding, **Leading Article.**

CLASS 45.—*Tandems, Mares or Geldings, driven on the third day of the Show.* [3 entries.]

I. (**£20.**)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown geldings, **Cestrian Furious** (9283) and **Melbourne Mark** (G 90).

II. (**£10.**)—R. BLACK, The Grove, Osbaldwick, York, **Haborough Shot** and **Buckley Fame.**

R.—G. SHEPPARD, 18, Chepstow Road, Newport, Mon., chestnut mare and gelding, **Axholme Elegance** and **Signet.**

CLASS 46.—*Pairs Mares or Geldings, driven on the third day of the Show.* [3 entries.]

I. (**£20.**)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown geldings, **Cestrian Furious** (9283), and **Melbourne Mark** (G 90).

II. (**£10.**)—R. BLACK, The Grove, Osbaldwick, York, **Haborough Shot** and **Buckley Fame.**

R.—G. SHEPPARD, 18, Chepstow Road, Newport, Mon., chestnut mare and gelding, **Axholme Elegance** and **Signet.**

CLASS 47.—*Mare or Gelding, not over* 13.2 *hands, driven on the fourth day of the Show.* [3 entries.]

I. (**£15.**)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown gelding, **Cestrian Furious** (9283).

II. (**£8.**)—T. EVANS, Danycoed, Blackpill, Glam., **Axholme Sunbeam.**

CLASS 48.—*Mare or Gelding,* 14.3 *hands or over, the property of a Tradesman carrying on business within the Borough of Swansea, used solely by him and driven regularly by himself or his servants, for the delivery of goods sold by him, for a period of not less than three months prior to May 17th,* 1923, *exhibited on the fourth day of the Show in Wagon, Trolley or Cart (not Dog Cart).* [5 entries.]

I. (**£4.**)—F. GAMBOLD, 51, Rhondda Street, Swansea, bay gelding, **Welsh Lad.**

II. (**£3.**)—S. SORENSON, 23, Brynymor Road, Swansea, bay mare, **Kitty.**

III. (**£2.**)—H. M. PALMER, 42, Marlborough Road, Swansea, chestnut mare, **Singleton Lass.**

IV. (**£1.**)—W. SAMUEL, St. Cadog Dairy, Swansea, chestnut gelding, **Mortimer.**

V. (**10s.**)—W. FULLER, V.C., 27, Evans Terrace, Swansea, chestnut gelding, **Grove Commander.**

CLASS 49.—*Mare or Gelding, under* 14.3 *hands, the property of a Tradesman carrying on business within the Borough of Swansea, used solely by him and driven regularly by himself or his servants, for the delivery of goods sold by him, for a period of not less than three months prior to May 17th,* 1923, *exhibited on the fourth day of the Show, in Wagon, Trolley, or Cart (not Dog Cart).* [5 entries.]

I. (**£4.**)—J. H. JOHN, 50, King Edward Road, Swansea, bay, **Bunty.**

II. (**£3.**)—W. G. THOMAS, Central Seed Stores, New Orchard Street, Swansea, dark bay mare, **Whitsun Horace.**

III. (**£2.**)—I. L. PASSMORE, 13, Jericho Street, Kilvey, Swansea, grey mare, **Mary Fach.**

IV. (**£1.**)—L. W. JAMES, Parkystadwen House, Bethel Road, Llansamlet, dark bay, **Beauty.**

V. (**10s.**)—J. PYE, Eden Avenue, chestnut mare, **Lady.**

CLASS 50.—*Stallion, Mare or Gelding, not over* 12.2 *hands, driven on the fifth day of the Show.* [2 entries.]

I. (**£5.**)—W. J. JACKETT, Ystalyfera, Swansea Valley, grey stallion, **Tawe Valley Ballistite** (992).

II. (**£4.**)—I. L. PASSMORE, 13, Jericho Street, Kilvey, Swansea, grey mare, **Mary Fach.**

CHAMPION PRIZE.

For the best Mare or Gelding, shown in any of the Novice or Open Harness Classes, driven in Single Harness on the fifth day of the Show.

I. (**£20.**)—A. MAITLAND, Thornleigh, Vicar's Cross, Chester, dark brown gelding, **Cestrian Furious** (9283).

R.—D. REES JONES, Penbryn Stud, Aberdare, **Penbryn Marietta.**

JUMPING.

CLASS 51.—*Mare or Gelding, any height, jumping over the course in the best form on the first day of the Show.* [18 entries.]

I. (**£10.**)—J. H. BETTS, Quarry Farm, Northfield, Birmingham, **Plain Jane.**

II. (**£5.**)—T. GLENCROSS, The Paddocks, Stoke Gifford, chestnut gelding, **Thumbs Up.**

III. (**£2.**)—F. ALLISON, Newbiggin, Penrith.

CLASS 52.—*Mare or Gelding, under* 14.2 *hands, jumping over the course in the best form on the first day of the Show.* [7 entries].

I. (£10.)—MISS M. A. BULLOWS, Edgbaston, Riding School, Birmingham, chestnut gelding, **If Not.**

II. (£5.)—D. F. WYLIE, Reabrook, Minsterley, Shrewsbury, brown mare.

III. (£2.)—M. R. VAUGHAN, Llanwyngar, Solva, roan mare, **Peggy.**

CLASS 53.—*Mare or Gelding,* 15 *hands and over, jumping over the course in the best form on the second day of the Show.* [8 entries.]

I. (£10.)—F. ALLISON, Newbiggin, Penrith.

II. (£5.)—T. GLENCROSS, The Paddocks, Stoke Gifford, bay gelding, **Monarch.**

III. (£2.)—F. ALLISON.

CLASS 54.—*Mare or Gelding, under* 15 *hands, jumping over the course in the best form on the second day of the Show.* [9 entries.]

I. (£10.)—CAPTAIN R. LAYE, The Warren, Wotton-under-Edge, Glos., **Ormond Boy.**

II. (£5.)—J. H. BETTS, Quarry Farm, Northfield, Birmingham, **Plain Jane.**

III. (£2.)—MISS E. LEWIS, Ffrwdydrain, Llandilo, black mare, **Doris.**

CLASS 55.—*Mare or Gelding, any height, jumping highest on the third day of the Show.* [10 entries.]

Equal I. (£5 13s. 4d.)—CAPTAIN R. LAYE, The Warren, Wotton-under-edge, bay gelding, **Tommy Dod.**

Equal I. (£5 13s. 4d.)—MISS E. LEWIS, Ffrwdydrain, Llandilo, black mare, **Doris.**

Equal I. (£5 13s. 4d.)—F. ALLISON, Newbiggin, Penrith.

CLASS 56.—*Mare or Gelding, any height, jumping over the course in the best form on the third day of the Show.* [18 entries.]

I. (£10.)—E. ADCOCK, The Grange, Thurmaston, Leicester, brown gelding, **Novice.**

II. (£5.)—CAPTAIN R. LAYE, The Warren, Wotton-under-edge, **Tommy Dod.**

III. (£2.)—T. GLENCROSS, The Paddocks, Stoke Gifford, **Thumbs Up.**

CLASS 57.—*Mare or Gelding,* 14.3 *hands and over, jumping over the course in the best form on the fourth day of the Show.* [11 entries.]

I. (£15.)—F. ALLISON, Newbiggin, Penrith.

II. (£7.)—CAPTAIN R. LAYE, The Warren, Wotton-under-Edge, **Tommy Dod.**

III. (£3.)—MISS E. LEWIS, Ffrwdydrain, Llandilo, black mare, **Doris.**

CLASS 58.—*Mare or Gelding, under* 14.3 *hands, jumping over the course in the best form on the fourth day of the Show.* [8 entries.]

I. (**£15.**)—J. H. BETTS, Quarry Farm, Northfield, Birmingham, **Plain Jane.**

II. (**£7.**)—D. F. WYLIE, Reabrook, Munsterley, Shrewsbury.

III. (**£3.**)—D. F. WYLIE.

CLASS 59.—*Mare or Gelding, any height, jumping highest on the fifth day of the Show.* [9 entries.]

I. (**£15.**)—F. ALLISON, Newbiggin, Penrith.

II. (**£7.**)—MISS E. LEWIS, Ffrwdydrain, Llandilo, black mare, **Doris.**

III. (**£3.**)—J. H. BETTS, Quarry Farm, Northfield, Birmingham.

CHAMPION CLASS.

CLASS 60.—*Mare or Gelding, any height, having won a prize in Classes* 51 *to* 59, *jumping the course in the best form on the fifth day of the Show.* [12 entries.]

I. (**£20**)—F. ALLISON, Newbiggin, Penrith.

II. (**£10.**)—T. GLENCROSS, The Paddocks, Stoke Gifford, **Monarch.**

III. (**£5.**)—T. GLENCROSS, **Thumbs Up.**

CATTLE.

DEVON.

(The Prizes in Class 61 and the First Prize in Class 62 were given by the Devon Cattle Breeders' Society).

CLASS 61.—*Devon Cow or Heifer, in-Milk, to be Milked in the Ring before judging, under Conditions No.* 59. [9 entries.]

I. (**£10.**)—N. D. LUPTON, Chalmington, Dorchester, Dorset, **Daisy** (B729), born 4th July, 1918, bred by H. H. Pearcey, Charton Rousdon, Lyme Regis ; s Stockleigh Rentmaker 2nd (9854). (Last calf, February 1, 1923).

II. (**£5.**)—J. H. CHICK, Wynford Eagle, Dorchester, Dorset, **Cherry 3rd** (B378), born 1st April, 1911, bred by H. G. Mayo, Corton, Dorchester, Dorset ; s Compton Steersman (6311), d Cherry (A123). (Last calf, January 21, 1923).

III. (**£2.**)—MRS. W. G. BUSK, Wraxall Manor, Dorchester, **Wraxall Poppy 2nd** (B636), born 3rd March, 1916, bred by the late W. G. Busk ; s Rakehill Forester (8237), d Wraxall Poppy (A410). (Last calf, February 16, 1923).

R.—MRS. W. G. BUSK, **Wraxall Bluebell** (A543), born 1915, bred by H. Gordie, Chilfrome, Dorchester.

H.C.—J. H. CHICK, **Wynford Dahlia,** born 15th January, 1920 ; s Wynford Lascar (9923), d Wynford Daisy 2nd, (B685), s d Compton Rattler (6309). (Last calf, March 1, 1923).

H.C.—W. D. CHICK, Compton Valence, Frampton, Dorchester, **Compton Carmine 3rd** (28145), born 27th February, 1913; s Compton Rainbow (7987), d Compton Carmine 2nd (26525), s d Compton Fiddler (6307).

C.—N. D. LUPTON, **Bryanstone Rebecca** (23820), born 9th December, 1909, bred by the late Viscount Portman, Bryanston, Blandford; s Bryanston Pitcher (5980), d Compton Rubble (19910), s d Nobleman (2848).

CLASS 62.—*Devon Cow or Heifer, in-Milk, calved in or before* 1920. [4 entries.]

I. (£10.)—C. MORRIS, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset, **Highfield Farthing 8th** (29398), born 26th December, 1916; s Highfield General (8105), d Highfield Farthing 5th (26925), s d Capton Bellringer (4911).

II. (£5.)—C. MORRIS, **Highfield Lottie 3rd** (33158), born 18th February, 1920; s Highfield Gauge (9689), d Highfield Lottie (27767), s d Longforth Mailbag (7439).

III. (£2.)—E. CLATWORTHY, Cutsey, Trull, Taunton, **Jellicoe's Lovely** (30238), born 23rd February, 1917, bred by S. Kidner, Milverton, Somerset; s Nower's Jellicoe (9011), d Goldfinder's Lovely 5th (27695), s d Stockleigh Goldfinder (7268).

CLASS 63.—*Devon Heifer, calved in* 1921. [5 entries.]

I. (£10.)—E. CLATWORTHY, Cutsey, Trull, Taunton, **Cutsey Betsy** (33818), born 12th March; s Overton Favourite (9797), d Young Betsy (33825), s d Holcombe Major (7413).

II. (£5.)—A. M. WILLIAMS, Werrington Park, Launceston, Cornwall, **Werrington Maggie** (34579), born 8th January; s Roadwater Goldfinder (10738), d Maggie (C683), s d Pickwell Duke (8619).

III. (£2.)—C. MORRIS, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset, **Highfield Gay Girl 7th** (34222), born 21st January; s Highfield Gauge (9689), d Highfield Gay Girl 3rd (30350), s d Highfield General (8105).

R.—C. MORRIS, **Highfield China Cup 13th** (34205), born 11th January; s Highfield Gauge (9689), d Highfield China Cup 6th (26917), s d Capton Bellringer (4911).

H.C.—R. BRUFORD, M.P., Nerrols, Taunton, Somerset, **Nerrols Lady Ruby 2nd,** born 21st July; s Holcombe Monaco (10148), d Lady Ruby 7th (27282), s d Lark's Curly Coat (6433).

CLASS 64.—*Devon Heifer, calved in* 1922. [6 entries.]

I. (£10.)—R. BRUFORD, M.P., Nerrols, Taunton, Somerset, **Nerrols Hawthorn 5th,** born 4th January; s Highfield Advance (9318), d Nerrols' Hawthorn (28094), s d Beauty's Tip Top (6974).

II. (£5.)—R. BRUFORD, M.P., **Nerrols' Hawthorn 6th,** born 15th January; s Highfield Advance (9318), d Nerrols' Hawthorn 3rd (30766), s d Highfield Chieftain (8915).

III. (£2.)—C. Morris, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset, **Highfield Bluebell 2nd** (Vol. 46), born 18th April; s Highfield Romance (11070), d Carey Bluebell 2nd (30529), s d Pound Laureate (9428).

R.—A. M. Williams, Werrington Park, Launceston, Cornwall, **Unity,** born 19th January; s Roadwater Goldfinder (10738), s Highfield Lottie (27767), s d Longforth Mailbag (7431).

C.—Bankes Settled Estates, Kingston Lacy, Wimborne, **Kingston Lacy Ora,** born 20th January; s Crazelowman Ruler (10509), d Kingston Lacy Kittie (34680), s d Pound Herald (9426).

Class 65.—*Devon Bull, calved in or before* 1921. [2 entries.]

I. (£10.)—A. M. Williams, Werrington Park, Launceston, Cornwall, **Roadwater Goldfinder** (10738), born 29th November, 1918, bred by A. J. Hill, Roadwater, Washford, Taunton; s Lovely's Duke 6th (8965), d Golden cup 79th (28411), s d Lovely's Duke 5th (8573).

II. (£5.)—C. Morris, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset, **Highfield Victor 3rd** (11530), born 1st January, 1921; s Pixford Giant (10258), d Highfield Countess 3rd (26058), s d Pound Lord Brassey 5th (5622).

Class 66.—*Devon Bull, calved in* 1922. [5 entries.]

I. (£10.)—A. L. Christie, J.P., Tapeley Park, Instow, North Devon, **Coombeshead Punch,** born 10th April, bred by H.R.H. the Prince of Wales, K.G., Duchy Home Farm, Stoke Climsland, Cornwall; s Clampit Nonsuch (10934), d Clampit Gladstone 3rd (29768), s d Highfield Gem (8919).

II. (£5.)—C. Morris, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset, **Highfield Nobleman** (Vol. 46), born 26th January; s Highfield Gem 2nd (9329), d Northmoor Gipsy (32455), s d Gotton Prince 2nd (8070).

III. (£2.)—E. Clatworthy, Cutsey, Trull, Taunton, **Cutsey Larkspur,** born 28th March; s Pound Paragon (11185), d Goldfinder's Lovely 5th (27695), s d Stockleigh Goldfinder (7268).

R.—R. Bruford, M.P., Nerrols, Taunton, Somerset, **Nerrols' Advance,** born 7th March; s Highfield Advance (9318), d Nerrol's Apricot (24878), s d Stockleigh Top Sawyer (6549).

C.—Bankes Settled Estates, Kingston Lacy, Wimborne, **Kingsto Lacy Oscar,** born 6th January; s Crazelowman Ruler (10509), d Kingston Lacy Keilah (34678), s d Pound Herald (9426).

CHAMPION PRIZES.

Given by H.R.H. The Prince of Wales, K.G.

A Challenge Cup, value £30, *for the best Bull exhibited in Class* 65 *or* 66, *to be won three times in succession or four times altogether before becoming the property of the winner.*

I.—A. M. Williams, Werrington Park, Launceston, Cornwall, Roadwater Goldfinder (10738), born 29th November, 1918, bred by A. J. Hill, Roadwater, Washford, Taunton; s Lovely's Duke 6th (8965), d Goldencup 79th (28411), s d Lovely's Duke 5th (8573).

R.—A. L. CHRISTIE, J.P., Tapeley Park, Instow, North Devon, **Coombeshead Punch,** born 10th April, bred by H.R.H. the Prince of Wales, K.G., Duchy Home Farm, Stoke Climsland, Cornwall; s Clampit Nonsuch (10934), d Clampit Gladsome 3rd (29768), s d Highfield Gem (8919).

GIVEN BY THE DEVON CATTLE BREEDERS' SOCIETY.

Best Animal exhibited in Classes 61 *to* 66.

I. (£10.)—A. M. WILLIAMS, Werrington Park, Launceston, Cornwall, **Roadwater Goldfinder** (10738), born 29th November, 1918, bred by A. J. Hill, Roadwater, Washford, Taunton; s Lovely's Duke 6th (8965), d Goldencup 79 (28411), s d Lovely's Duke 5th (8573).

R.—C. MORRIS, Highfield Hall, St. Albans, and Bishop's Lydeard, Somerset. **Highfield Farthing 8th** (29398), born 26th December, 1916; s Highfield General (8105), d Highfield Farthing 5th (26925), s d Capton Bellringer (4911).

SOUTH DEVON.

(The First Prize in Class 67 was given by the South Devon Herd Book Society).

CLASS 67.—*South Devon Cow or Heifer, in-Milk, calved in or before* 1920. [4 entries.]

I. (£10.)—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Highlands Wallflower** (21803), born 18th June, 1919, bred by Mrs. J. Bayly, Highlands, Ivybridge; s Lilian's Champion (6016), d Bring Good (17057).

II. (£5.)—LORD MILDMAY OF FLETE, **Lilly 9th,** born 8th May 1917; s Lilian's Champion (6016), d Lilly 4th (11826), s d The King (1383).

III. (£2.)—W. L. HOSKING & SONS, Fentongollan, Probus, Cornwall, **Fentongollan Buttercup** (18293), born 31st March, 1917; s Blagdon Major (4750), d Corona (10842), s d Blossom's Boy.

CLASS 68.—*South Devon Heifer, calved in* 1921. [1 entry.]

I. (£10.)—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Flete Countess 2nd,** born 21st February; s General (7757), d Countess 2nd (18522), s d Lilian's Champion (6016).

CLASS 69.—*South Devon Heifer, calved in* 1922. [1 entry.]

I. (£10.)—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Flete Lilian** born 6th January; s Trehele Forester (9500), d Lilian's Maid (14232), s d Doncaster (3720).

CHALLENGE CUP.

GIVEN BY THE PRESIDENT (H.R.H. THE PRINCE OF WALES, K.G.).

A Silver Challenge Cup for the best Cow, in-Milk, in the South Devon Classes, to be won three times in succession or four times altogether before becoming the property of the Winner.

I.—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Highlands Wallflower** (21803), born 18th June, 1919, bred by Mrs. J. Bayly, Highlands, Ivybridge; s Lilian's Champion (6016), d Bring Good (17057).

R.—LORD MILDMAY OF FLETE, **Lilly 9th,** born 8th May, 1917; s Lilian's Champion (6016) d Lilly 4th (11826), s d The King (1383).

CLASS 70.—*South Devon Bull, calved in or before* 1921. [2 entries.]

I. (£10.)—CAPTAIN J. T. CORYTON, Pentillie Castle, East Cornwall, **Mothecombe Milkman,** born 29th January, 1917, bred by J. M. Wroth, Combe, Holbeton, Plymouth; s Brownstone Laddie (4774), d Kitty (11346), s d Merafield Paymaster (3491).

II. (£5.)—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Trehele Forester** (9500), born 25th January, 1920, bred by Mrs. L Luscombe and Son, Trehele, Modbury, Ivybridge, Devon; s Widland Forester (6875), d Yellow Maid 2nd (14147), s d Forester (4828).

CLASS 71.—*South Devon Bull, calved in* 1922. [3 entries.]

I. (£10.)—W. L. HOSKING & SONS, Fentongollan, Probus, Cornwall, **Fentongollan Useful,** born 14th May; s Antony Milkman (8261), d Fentongollan Dora 2nd (19899), s d Stretchford Masterpiece (6793).

II. (£5.)—W. L. HOSKING & SONS, **Fentongollan Unique,** born 28th May; s Fentongollan Apollo (8466), d Fentongollan Joy (21580), s d Stretchford Masterpiece (6793).

III. (£2.)—LORD MILDMAY OF FLETE, Ermington, S.O., Devon, **Flete General,** born 26th May; s General (7757), d Countess Second (18522), s d Lilian's Champion (6016).

SHORTHORN.

CLASS 72.—*Shorthorn Cow, in-Milk, calved before* 1920. [2 entries.]

I. (£10.)—CAPTAIN A. M. TALBOT FLETCHER, Saltoun, Pencaitland, East Lothian, and Margam Park, Port Talbot, roan, **Bellona Girl** (2908), born 11th March, 1919; s Newton Renown (121779), d Rosebel 10th (Vol. 57, p. 980), s d Golden Mascot (95330).

II. (£5.)—LORD MERTHYR, Hean Castle, Saundersfoot, Pembrokeshire, white, **Hean Cressida,** born 28th April, 1916; s Royal Roman (122652), d Charity 14th, s d Newton Crystal (92658).

CLASS 73.—*Shorthorn Heifer, in-Milk, calved in* 1920. [4 entries.]

I. (£10.)—O. W. PORRITT, Hotchley Farm, East Leake, near Loughborough, roan, **Hotchley Countess,** born 19th September; s Sanquhar Grand Courtier (139193), d Gipsy Countess 3rd (Vol. 59, p. 881).

II. (£5.)—COL. F. RHODES, Brockhampton, Andoversford, Glos., roan, **Cotehay Queen Augusta,** born 1st January; s Moonlight (126984), d Sherborne Augusta, s d Edgcote Promotion (111682).

III. (£2.)—F. H. S. PERKINS, Wye Croft, Monmouth, red, **Hadnock Charming Lass** (26), born 28th May; s Hadnock Ranger (142788), d Hadnock Charming Lass 9th, s d Mister Dooley (112572).

CLASS 74.—*Shorthorn Heifer, calved in* 1921. [8 entries.]

I. (£10.)—H.R.H. THE PRINCE OF WALES. K.G., Home Farm, Stoke Climsland, roan, **Maid Marion,** born 8th February; s Butterfly Knight (130029), d Adbolton Mario's Queen 3rd, s d King Christian of Denmark (86316).

II. (**£5.**)—THE HON. MRS. BRUCE WARD, Godinton, Ashford, Kent, roan, **Godinton Jilt,** born 4th February; s Dewlaps Royal Sovereign (125170), d Adbolton Jilt (Vol. 61, p. 794), s d Adbolton Thaba King 2nd (110696).

III. (**£2.**)—L. V. GARLAND, Greenbank, Hayle, roan, **Towan Queen** (G.L.V.C. 6), born 24th November; s Butterfly Leader (154520), d Beauty Sleep (Vol. 58, p. 678), s d Golden Cloud 2nd (108751).

R.—H C. SUTTON, Benham Park, Newbury, dark roan, **Benham Mayflower** 2nd, born 6th January; s Proud Augusta (151245), d Benham Mayflower, s d Fairlawne Maxtone (130929).

H.C.—T. E. JENKINS, Kilvrough, Parkmill, Glam., roan, **Kilvrough Perfection,** born 12th October; s Kingham (143325), d Evelyn Perfection, s d Hean Jupiter (131416).

C.—R. STRATTON, The Duffryn, Newport, roan, **Antidote** (68—1269), born 3rd March; s Greenhorn (142746), d Embargo (60—1091), s d Contango (108251).

CLASS 75.—*Shorthorn Heifer, calved in* 1922. [17 entries.]

I. (**£10.**)—CAPTAIN A. M. TALBOT FLETCHER, Saltoun, Pencaitland, East Lothian, and Margam Park, Port Talbot, roan, **Claret Gem 5th,** born 13th February, bred by G. B. Shields, Dolphingstone, East Lothian; s Double Event (162830), d Claret Gem (Vol. 65, p. 1094), s d Esmond's Heir (136435).

II. (**£5.**)—L. V. GARLAND, Greenbank, Hayle, white, **Towan Fairy Queen** (G.L.V.D.2), born 29th April; s Climsland Cavalier (162225), d Hayle Evening Star (Vol. 67, p. 804), s d Flight of Uln (142416).

III. (**£2.**)—H.R.H. THE PRINCE OF WALES, K.G., Home Farm, Stoke Climsland, red, **Climsland Lady Dorothy 5th,** born 3rd January; s Christian King (147900), d Climsland Lady Dorothy 3rd, s d Collynie Red Knight (124849).

R.—H. C. SUTTON, Benham Park, Newbury, roan, **Benham Nightlight,** born 26th January; s Proud Augusta (151245), s d Benham Dawnlight, s d Benham Mars (140921).

H.C.—LORD GLANELY, Lackham, Lacock, Wilts, roan, **Lackham Clipper,** born 4th February; s Collynie Clipper King (135816), d Shenstone Clipper 3rd, s d Scottie (133446).

C.—COL. CURRE, Itton Court, Chepstow, roan, **Pellipar Bud, 3rd,** born 17th March, bred by Lieut.-Col. R. J. L. Ogilby, Moreton Hall, Moreton Morrell, Warwickshire; s Edgcote Regalia (125396), d Crystal Bud, s d Newton Crystal.

CLASS 76.—*Shorthorn Bull, calved in* 1919 *or* 1920. [6 entries.[

I. (**£10.**)—D. BEYNON, Ynyshafren, Ponthenry, Llanelly, roan, **Pitsford Count** (165920), born 15th September, 1920, bred by G. H. Drummond, Pitsford Hall, Northampton; s Pierrepont Alliance (144423), d Village Countess, s d Royal Rose (106937).

II. (**£5.**)—CAPTAIN A. M. TALBOT FLETCHER, Saltoun, Pencaitland, East Lothian, and Margam Park, Port Talbot, white, **Naemoor Druid** (165542), born 1st February, 1920, bred by J. J. Moubray, Naemoor, Rumbling Bridge; s Edgcote Masterpiece (115277), d Goldie 34th (Vol. 63, p. 648), s d Proud Champion (100096).

III. (£2.)—D. PERKINS & SON, Trefelyn, Letterston, red, **Hardwicke Victor** (156299), born 25th April, 1919, bred by F. and F. B. Bibby, Hardwicke Grange, Shrewsbury; s Prince Paul (117064), d Gainford Goldie 6th, s d Proud Victor (103447).

R. & V.H.C.—JAMES BROS., Llanddewi Castle, Reynoldston, Swansea, light roan, **Tredegar Relish,** born 15th June, 1919, bred by W. H. James, Parc-le-breos, Farm, Penmaen, Swansea; s Tredegar Champion, d Fancy Lass, s d Tariff Reform.

CLASS 77.—*Shorthorn Bull, calved in* 1921. [7 entries.]

I. (£10.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester, white, **Somborne Plume** (176283), born 4th March; s Throsk Broadhooks 46th (159943), d Broadhooks Queen 15th (1935).

II. (£5.)—T. DAVIES, Cwmsawdde, Llangadock, roan, **Cudham Golden Star** (170756), born 12th July, bred by A. W. Maconochie, Cudham, Kent; s Cluny Sir Augustus (141658), d Kinellar Goldie, s d Royal Major (127921).

III. (£2.)—THE HON. MRS. BRUCE WARD, Godinton, Ashford, Kent, dark roan, **Balcairn Eagle** (168680), born 8th April, bred by F. L. Wallace, Balcairn, Old Meldrum, Aberdeenshire, N.B.; s Earl of Kingston (120041), d Edgcote Doris (Vol. 62, p. 773), s d Ascott Magnet (118612).

R.—O. W. PORRITT, Estate Office, Helmshore, roan, **Musbury Magnate,** born 21st February; s Redgorton Guardian (151419), d Auchnacree Lady 5th, s d Auchnacree Rajah (134744).

H.C.—COLONEL SIR F. BEAUCHAMP, BART., Woodborough House, near Bath, red, **Ruddigore** (175829), born 3rd January, bred by F. C. and W. C. Stevenson, Swepstone, Leicester; s Edgcote Treasure (142229), d Red Rosebud 3rd (Vol. 65, p. 1121), s d Abbot (123762).

C.—L. D. NICHOLL, Laleston, Bridgend, and D. P. Barnett, Danygraig, Newton, Porthcawl, red roan, **Balthayock Regenerator** (168848), born 20th, December, bred by R. Wylie Hill, Balthayock, Perth; s Lothian Buzzard (157426), d Lady Ramsden 7th, s d Collynie Golden Star (130289).—R. TEMPLETON, Pontcanna Farm, Cardiff, roan, **Edeyrion Knight,** born 24th April, bred by W. Jones, Penlan, Corwen, North Wales; s Thornton Dalesman (152560), d Czarina 47th (Vol. 62, p. 1006), s d Cherry Conqueror (119429).

CLASS 78.—*Shorthorn Bull, calved in* 1922. [10 entries.]

I. (£10.)—H.R.H THE PRINCE OF WALES, K.G., Home Farm, Stoke Climsland, white, Climsland Dandy Duke, born 9th May; s Bapton Bonsdman (153739), d Myrtle's Dandy 2nd, s d Collynie Premier (124847).

II. (£5)—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading Berks, red roan, **Basildon Roan Rambler,** born 13th January; s Collynie Grand Prince (154921), d Alice Ramsden (Vol. 65, p. 935), s d Mill Hills Rothes King (138020).

III. (£2.)—R. STRATTON, The Duffryn, Newport, Mon., roan, **Woodpecker** (Vol. 69), born 28th January; s Oxford Prince (165769), d Popingay (65—1129), s d Beatty (135034).

R.—COLONEL CURRE, Itton Court, Chepstow, red roan, **Pelligar Air Noble**, born 25th February, bred by Lieut.-Col. R. J. L. Ogilby, Moreton Hall, Moreton Morrell, Warwickshire; s Fairlawne Air Raid (148740), d Nonpariel Regalia, s d Edgcote Regalia (125396).

H.C.—L. D. NICHOLL, Laleston, Bridgend, and D. P. Barnett, Danygraig, Newton, Porthcawl, dark roan, **Goldie's Cupbearer**, born 30th March, bred by L. D. Nicholl, Laleston, Bridgend, Glam.; s Golden Charm (136750), d Goldie's Charm, s d Ringleader (106744).

CHAMPION PRIZE.

GIVEN BY THE SHORTHORN SOCIETY.

Best Bull in Classes 76 *to* 78, *entered in, or eligible for entry in Coates's Herd Book, with Silver Medal to the Breeder.*

I. (£10.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester, white, **Somborne Plume** (176283), born 4th March; s Throsk Broadhooks 46th (159943), d Broadhooks Queen 15th (1935).

R.—D. BEYNON, Ynyshafren, Ponthenry, Llanelly, roan **Pitsford Count** (165920), born 15th September, 1920, bred by G. H. Drummond, Pitsford Hall, Northampton; s Pierrepont Alliance (144423), d Village Countess, s d Royal Rose (106937).

DAIRY SHORTHORN.

(The First Prizes in Classes 79 and 80 (and a Silver Medal to the Breeder of the winners) were given by the Shorthorn Society in conjunction with the Dairy Shorthorn Association, and the First Prize in Class 83 by the Dairy Shorthorn Association).

CLASS 79.—*Dairy Shorthorn Pedigree Cow, in-Milk, calved in or before* 1919, *eligible for, and entered in Coates's Herd Book, or pedigree sent for such entry previous to the Show, and not having previously won a similar prize offered by the above-named Society or Association in* 1923, *milked in the Ring before judging, under Condition* 59. [9 entries.]

I. (£10.)—MAJOR R. W. COOPER, M.C., Rush Court, Wallingford, red and little white, **Street Ashton Princess 8th** (Vol. 60, p. 820), born 19th November, 1913, bred by the late Col. A. W. Henderson; s Barton Ronald (104719), d Street Ashton Princess 3rd, s d Golden Butterfly (95310).

II. (£5.)—MAJOR R. W. COOPER, M.C., red, **Cowslip 4th** (Vol. 62, p. 623), born 5th April, 1915, bred by the late B. Ashwin; s Honeybourne Gay Duke (126071), d Cowslip, s d Dr. Garden (91488).

CLASS 80.—*Dairy Shorthorn Pedigree Cow, in-Milk, calved in or after* 1920, *eligible for, and entered in Coates's Herd Book, or pedigree sent for such entry previous to the Show, and not having previously won a similar prize offered by the above-named Society or Association in* 1923, *milked in the Ring before judging, under Conditions* 59. [3 entries.]

I. (**£10.**)—F. H. S. PERKINS, Wye Croft, Monmouth, red, **Hadnock Charming Lass** (26), born 28th May; s Hadnock Ranger (142788), d Hadnock Charming Lass 9th, s d Mister Dooley (112572).

(The Prizes in Class 81 were given by E. Ezra, Esq., of Lock, Partridge Green, Sussex).

CLASS 81.—*Dairy Shorthorn Pedigree Heifer, calved in* 1922, *eligible for and entered in Coates's Herd Book, or pedigree sent for such entry previous to the Show, subject to Conditions No.* 60. [6 entries.]

I. (**£10.**)—E. EZRA, Lock, Partridge Green, Sussex, roan, **Lock Turner 5th,** born 2nd February; s Proud Victor, d Freshwater Turner 1st, s d Duke of Acomb.

II. (**£5.**)—E. EZRA, red and little white, **Lock Turner 4th,** born 2nd February; s Proud Victor, d Freshwater Turner 1st, s d Duke of Acomb.

III. (**£2.**)—F. S. FRANCIS, Wilkin Throop Farm, Templecombe, red, **Colescombe Ringlet 2nd,** born 27th March, bred by W. G. Millar, Bampton, Oxford; s Colescombe Graceful Lad, d Colescombe Ringlet, s d Knowsby Dolphin (13728).

R.—F. S. FRANCIS, red, **Colescombe Ringlet 3rd,** born 21st April, bred by W. G. Millar, Bampton, Oxford; s Knowsby Dolphin, d Lacy Ringlet 18th, s d Puddington Rosador (117159).

H.C.—WEBBINGTON FARMS, LTD., Webbington, Axbridge, Somerset, roan, **Mulcaster Laura,** born 18th January, bred by Sir C. Allom, Burton Hole Farm, Mill Hill, Middlesex; s Kelmscott Jellicoe 9th (149702), d Highworth Daisy 2nd (Vol. 65, p. 674), s d Prince Seraphine (132848).

CLASS 82.—*Dairy Shorthorn Pedigree Bull, calved before* 1922. [6 entries.]

I. (**£10.**)—W. C. SPENCER & SONS, Bushley Park, Tewkesbury, roan, **Rickerscote Leader,** born 3rd February, 1921, bred by C. and E. Stephenson, Burton House, Stafford; s Somerford Record (139464), d Dot 4th, s d Lord Seraphina (116331).

II. (**£5.**)—E. EZRA, Lock, Partridge Green, Sussex, white, **Lock Dairyman,** born 12th May, 1921; s Proud Victor, d Lacy Welcome, s d Dairyman.

III. (**£2.**)—H. GRIFFITHS, Glanrhydeison, Manordilo, red and little white, **Lord Price** (164983), born 9th June, 1920, bred by R. N. Tory, Anderson, Blandford; s Babraham Lord Price (140572), d Damory Barrington Duchess 7th (Vol. 65), s d Conductor (105095).

R.—WEBBINGTON FARMS, LTD., Webbington, Axbridge, Somerset, red, **Eaton Diamond Gift** (171328), born 2nd January, 1921, bred by the Duke of Westminster, G.C.V.O., D.S.O., Eaton Hall, Chester; s Carleton Style (147781), d Lily Agnes (Vol. 64, p. 1372), s d Puddington Red Admiral (127515).

CLASS 83.—*Dairy Shorthorn Pedigree Bull, calved in* 1922, *entered or pedigree accepted for entry on Coates's Herd Book, subject to Conditions No.* 60. [3 entries.]

I. (£10.)—WEBBINGTON FARMS, LTD., Webbington, Axbridge, Somerset' white, **Webbington Happy Thought**, born 5th May, bred by F. C. Tiarks, Foxbury, Chislehurst, Kent; s Foxhill Bright Idea (163343), d Combebank Lily 2nd (Vol. 65, p. 974), s d Foundation Stone (105524).

HEREFORD.

CLASS 84.—*Hereford Cow, in-Milk, calved before* 1920. [2 *entries.*]

I. (£10.)—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, red and white, **Crossways Opal** (Vol. 50, p. 1019), born 6th January, 1919; s Ringer (31920), d Sheepcote Opal (Vol. 50, p. 1019), s d Milton (25571).

II. (£5.)—W. G. BUCHANAN, Manor House Farm, Abergavenny, **Curly 7th**, born 17th March, 1916, bred by Sir J. R. G. Cotterell, Bart., Garnons, Hereford; s Purple King (29294), d Curly 2nd, s d Old Sort (24826).

CLASS 85.—*Hereford Heifer, in-Milk, calved in* 1920. [2 entries.]

I. (£10.)—D. P. BARNETT, Walterston, Llancarfan, near Cowbridge, **Lucy**, born 17th March; s Raffles (35505), d Shelsley Lucy (Vol. 50, p. 874), s d Eaton Sovereign (26832).

II. (£5.)—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, **Crossways Olivia** (Vol. 51, p. 737), born 17th January; s Vandal (31144), d Olivia (Vol. 48, p. 989), s d Orion (30854).

CLASS 86.—*Hereford Heifer, calved in* 1921. [6 entries.]

I. (£10.)—D. P. BARNETT, Walterston, Llancarfan, Cowbridge, **Snowdrop**, born 22nd January; s Walterston Sam (38309), d Dolesome (Vol. 50, p. 870), s d Sir Sam (33131).

II. (£5.)—W. H. B. CAVE, Wall End, Monkland, Leominster, **Bonnie Nell**, born 8th February; s Sucknell Best (34316), d Bonnie May.

III. (£2.)—W. WALKER, Shelsley Walsh, Worcester, **Walsh Prudence**, born 20th March; s Brampton Index (32285), d Patty, s d Carbine (28132).

R.—O. WILLIAMS, Crossways, Cowbridge, Glam., **Crossways Beauty**, born 2nd January; s Resolute (35537), d Beauty 10th, s d Leen Vistula (31664).

C.—W. G. BUCHANAN, Manor House Farm, Abergavenny, **Diadem 22nd**, born 13th February, bred by Sir J. R. G. Cotterell, Bart., Garnons, Hereford; s Anchor (32185), d Diadem 17th, s d Saladin (31957).

CLASS 87.—*Hereford Heifer, calved in* 1922. [11 entries.]

I. (**£10.**)—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, **Crossways Belle 2nd**, born 28th January; s Resolute (35537), d Bolinda 2nd (Vol. 49, p. 550), s d Lord Tarrington (29198).

II. (**£5.**)—H. MORELAND, Marstow Court, Marstow, Ross-on-Wye, **Marstow Ada**, born 10th January; s Prince (37743), d Piperall (Vol. 51, p. 502), s d Newton Major (32843).

III. (**£2.**)—H. MORELAND, **Marstow Annie**, born 2nd January; s Prince (37743), d Bangle (Vol. 50, p. 675), s d Midshipman (26308).

R.—J. WALKER, Knightwick Manor, Worcester, **Knightwick Cicely**, born 2nd January; s Aldersend Patrician (38472), d Cyclamen (Vol. 48, p. 1063), s d Royal Prince (28747).

V.H.C.—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, **Dinam Agatha**, born 4th January, bred by D. Davies, M.P., M.F.H., Broneirion, Llandinam, Co. Montgomery; s Resolute 2nd (39895), d Agate, s d Leen Vistula (31664).

H.C.—W. H. P. REES, Pantysgallog, Sennybridge, Breconshire, **Rosebud 2nd**, born 12th February; s Eaton Peer, d Rosebud, s d All Right.

C.—D. P. BARNETT, Walterston, Llancarfan, Cowbridge, born 23rd February; s Crossways Hampton (38922), d Hilston Rosary, s d Sir Sam (33131).

CHAMPION PRIZE.

GIVEN BY THE HEREFORD HERD BOOK SOCIETY.

Best Registered Cow or Heifer in Classes 84 *to* 87.

I. (**£10.**)—D. P. BARNETT, Walterston, Llancarfan, Cowbridge, **Snowdrop**, born 22nd January; s Walterston Sam (38309), d Dolesome (Vol. 50, p. 870), s d Sir Sam (33131).

R.—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, red and white, **Crossways Opal** (Vol. 50, p. 1019), born 6th January, 1919; s Ringer (31920), d Sheepcote Opal (Vol. 50, p. 1019), s d Milton (25571).

CLASS 88.—*Hereford Bull, calved in* 1919 *or* 1920. [4 entries.]

I. (**£10.**)—H. R. EVANS, Court of Noke, Pembridge, **Charles 2nd** (36303), born 26th January, 1919, bred by R. G. Heygate, The Wells, Bromyard; s Pretender (31946), d Sea Bird (Vol. 48, p. 667), s d Morier (38468).

II. (**£5.**)—H. MORELAND, Marstow Court, Marstow, Ross-on-Wye, **Chitstone Favourite**, born 5th January, 1920, bred by P. Addis & Son, Upper Chilstone, Madley, Hereford; s Boderham Gunner (33381), d Pretty Poll 3rd, s d Eaton Domino (29081).

III. (**£2.**)—W. A. GRIFFITHS, Highway Farm, Parkmill, **Faraam Ranter**, born 24th April, 1920, bred by F. F. Mason, Killay; s Faraam Roselyn (36679), d Pertort, s d Eaton Garnet (26085).

R.—W. G. BUCHANAN, Manor House Farm, Abergavenny, **Ankerdine Cocoanut**, born 10th January, 1920, bred by T. L. Walker, The Cedars, Broadwas-on-Teme, Worcs.; s Court Card (29367), d Nutty (Vol. 50, p. 970), s d Majestic (30761).

CLASS 89.—*Hereford Bull, calved in* 1921. [7 entries.]

I. (£10)—H. MORELAND, Marstow Court, Marstow, Ross-on-Wye, **Marstow Plum,** born 5th March ; s Frome Star (31486), d Plum Tart, s d Lord Langston (29195).

II. (£5.)—H. S. BERRY, Buckland, Bwlch, R.S.O., Breconshire, **Byford Return,** born 2nd January, bred by A. W. Trotman, Byford Court, Hereford ; s America, d Rarity, s d Sir Sam.

III. (£2.)—O. WILLIAMS, J.P., Crossways, near Cowbridge, Glamorgan, **Crossways Gay Lad** (40775), born 6th May ; s Lloyd George (33898), d Gay Maid 4th (Vol. 50, p. 587), s d Lincoln (32707).

R.—D. P. BARNETT, Walterston, Llancarfan, Cowbridge, **Apsam,** born 24th April ; s Walterston Sam (38309), d Shelsley Lucy (Vol. 50, p. 874), s d Eaton Sovereign (26832).

V.H.C.—O. WILLIAMS, **Crossways Intrepid** (40778), born 23rd April ; s Bodenham Gallant (34638), d Nancy, s d Aaron (25084).

H.C.—DINAM ESTATES COMPANY, Llandinam, Co. Montgomery, **Dinam Marathon** (40824), born 2nd January, bred by D. Davies, M.P., Broneirion, Llandinam, Co. Montgomery ; s Resolute (35537), d Merlin 9th, s d Marathon (27000).

C.—F. F. MASON, The Faraam, Killay, Glamorganshire, **Faraam Serenader,** born 7th January ; s Faraam Sparta (36685), d Faraam Mistletoe (Vol. 51, p. 524), s d Pentwyn Rougemont (31813).

CLASS 90.—*Hereford Bull, calved in* 1922. [3 entries.]

I. (£10.)—T. W. DAVIES, The Cefn, Pontypridd, **Beau Donald** (41919), born 16th January, bred by W. H. Jones, Brook Farm, Lyonshall, Herefordshire ; s Marlborough (35293), d Beauty (Vol. 48, p. 607), s d Protestant (27124).

II. (£5.)—F. F. MASON, The Faraam, Killay, Glamorgan, **Faraam Shrub,** born 3rd April ; s Faraam Satyr (39128), d Holly Twin (Vol. 51, p. 75), s d Holly Bush David (31587).

CHAMPION PRIZE.

GIVEN BY THE HEREFORD HERD BOOK SOCIETY.

Best registered Bull in Classes 88 *to* 90.

I. (£10.)—H. R. EVANS, Court of Noke, Pembridge, **Charles 2nd** (36303), born 26th January, 1919, bred by R. G. Heygate, The Wells, Bromyard ; s Pretender (31946), d Sea Bird (Vol. 48, p. 667), s d Morier (38468).

R.—H. MORELAND, Marstow Court, Marstow, Ross-on-Wye, **Marstow Plum,** born 5th March ; s Frome Star (31486), d Plum Tart, s d Lord Langston (29195).

SUSSEX.

(The Prizes in Class 91 and the Silver Medals were given by the Sussex Herd Book Society).

CLASS 91.—*Sussex Cow or Heifer, in-Milk, calved in or before* 1920. [3 entries.]

I. (£10.)—E. EZRA, Lock, Partridge Green, Sussex, **Drungewick Daisy 16th,** born 26th February, 1920; s Drungewick A 17th, d Drungewick Daisy 14th, s d Drungewick Marksman 3rd.

II. (£5.)—SIR J. ESPLEN, BART., K.B.E., Hardres Court, Canterbury, Kent, **Ticehurst Galatea 4th** (17342), born 14th February, 1917, bred by W. Ford, Singehurst, Ticehurst, Sussex; s Linton 2nd (3291), d Ticehurst Galatea 2nd (14799), s d Apsley Albert (2544).

III. (£2.)—C. NEWINGTON, Oakover, Ticehurst, Sussex, **Oakover Sweet Pea 16th** (19573), born 12th April, 1920; s Mabledon Lad (4326), d Sweet Pea 12th (11103), s d Tutsham Gold (1946).

CLASS 92.—*Sussex Heifer, calved in* 1921 *or* 1922. [4 entries.]

I. (£10.)—SIR J. ESPLEN, BART., K.B.E., Hardres Court, Canterbury, Kent, **Normanhurst Albertina 2nd** (19734), born 9th April, 1921, bred by the Executors of 2nd Earl Brassey, Normanhurst Court, Battle, Sussex; s Billions Scotney (4446), d Normanhurst Albertina (17238), s d Oakover Bewbush 1st (2592).

II. (£5.)—E. EZRA, Lock, Partridge Green, Sussex, **Marland's Lady Knelle,** born 15th November, 1921, bred by H. G. Latilla, Marlands, Itchingfield, Horsham; s Jacobite, d Knelle Flirt Lady, s d Lynwick Luck.

III. (£2.)—SIR J. ESPLEN, BART., K.B.E., **Holborough Cherry 1st** (20268), born 11th February, 1921, bred by Major W. L. H. Roberts, Holborough Court, Rochester; s Lock Rufus (3995), d Lynwick Rock Cherry 5th (16682), s d Drungewick K.C. 3rd (2662).

R.—MAJOR J. R. WARREN, M.C., J.P., Handcross Park, near Hayward's Heath, Sussex, **Dale Daisy 2nd,** born 23rd January, 1921, bred by Lieut.-Col. A. F. Fletcher, Dale Park, Arundle; s Ridge Rufus (4844), d Huggett's Daisy (16740), s d Shillinglee Gold 7th (2681).

SILVER MEDAL.

Best Cow or Heifer in Class 91 *or* 92.

I.—E. EZRA, Lock, Partridge Green, Sussex, **Drungewick Daisy 16th,** born 26th February, 1920; s Drungewick A 17th, d Drungewick Daisy 14th, s d Drungewick Marksman 3rd.

R.—SIR J. ESPLEN, BART., K.B.E., Hardres Court, Canterbury, Kent, **Normanhurst Albertina 2nd** (19734), born 9th April, 1921, bred by the Executors of 2nd Earl Brassey, Normanhurst Court, Battle, Sussex; s Billions Scotney (4446), d Normanhurst Albertina (17238), s d Oakover Bewbush 1st (2592).

CLASS 93.—*Sussex Bull, calved in* 1920, 1921 *or* 1922. [1 entry.]

I. (£10.)—C. NEWINGTON, Oakover, Ticehurst, Sussex, **Oakover Chevalier 6th** (5610), born 5th March, 1921; s Chevalier 2nd (3673), d Favourite 21st (13061), s d Orchardmains Squire (2475).

SILVER MEDAL.

Best Bull in Class 93.

I.—C. NEWINGTON, Oakover, Ticehurst, Sussex, **Oakover Chevalier 6th** (5610), born 5th March, 1921; s Chevalier 2nd (3673), d Favourite 21st (13061), s d Orchardmains Squire (2475).

RED POLL.

(£34 towards the Prizes in Classes 94 to 98 were given by the Red Poll Cattle Society).

CLASS 94.—*Red Poll Cow, in-Milk, calved before* 1921. [4 *entries.*]

I. (£10.)—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks, **Sudbourne Comfit** (25965), born 10th August, 1916; s Sudbourne Credit (10796), d Sudbourne Comfort (22355), s d Sudbourne Spicy (9751).

II. (£5.)—THE VISCOUNT FOLKESTONE, Longford Castle, Salisbury, **Longford Ruby**, born 19th August, 1915, bred by the Earl of Radnor, Longford Castle, Salisbury; s Longford King (10762), d Longford Diamond (22172), s d Demon (9789).

III. (£2.)—W. L. HORBURY, Ditchford Farm, Moreton-in-Marsh, Glos., **Framlingham Fine Lady**, born 5th December, 1915, bred by W. Woodgate, Fairfield, Framlingham, Suffolk; s Framlingham Royal Davison, d Worlingworth Proud Lady, s d Royal Blue.

R.—MRS. M. PARRY, Talybryn, Bwlch S.O., Breconshire, **Blanche** (27468), born 29th December, 1918, bred by R. McGeorge; s Framlingham Davyson (10850), d Kirton Nap (27942), s d Ashmoor Variety (10829).

CLASS 95.—*Red Poll Heifer, calved in* 1921. [4 entries.]

I. (£10.)—H. M. CAUTLEY, Neutral Farm, Butley, Tunstall R.S.O., Suffolk, **Butley Crystal** (29674), born 24th September; s Upton Rustler (11829), d Manor Marigold (26335), s d Redgrave Royal (10350).

II. (£5.)—S. M. DENNIS, Sharnden, Mayfield, Sussex, **Sharnden Rosebud**, born 8th May; s Knepp David (11398), d Sudbourne Rosebud (24383), s d Acton Crowfoot (9987).

III. (£2.)—W. L. HORBURY, Ditchford Farm, Moreton-in-Marsh, Glos., **Upton Sago**, born 20th February; s Upton Crochet, d Sudbourne Sage, s d Acton Crowfoot.

R.—MRS. M. M. FITZGERALD, Marsden Manor, Cirencester, **Marsden Miranda**, born 13th December; s Knepp Grenadier (12038), d Meddler Norah (28031), s d Meddler Armistice (11416).

CLASS 96.—*Red Poll Heifer, calved in* 1922. [2 entries.]

I. (£10.)—THE VISCOUNT FOLKESTONE, Longford Castle, Salisbury, **Wykham Sweet Cup**, born 19th February, bred by S. Moxham, Sharnford, Winchester; s Wykham Mikado (11851), d Gressenhall Dagmar (24006), s d Gressenhall Storm King (10176).

II. (**£5.**)—W. L. HORBURY, Ditchford Farm, Moreton-in-Marsh, Glos., **Upton Shirley Poppy,** born 14th February; s Upton Crochet, d Framlingham Poppy, s d Framlingham Emperor.

CLASS 97.—*Red Poll Bull, calved in or before* 1921. [4 entries.]

I. (**£10.**)—E. C. LINDSAY, Annvale House, Keady, Co. Armagh, **Marham Florin** (11732), born 17th January, 1919, bred by T. Brown & Son, Marham Hall, near King's Lynn; s Marham Dauntless (11031), d Flutter (18046), s d Wentworth (5257).

II. (**£5.**)—G. R. P. LLEWELLYN, Combend, Elkstone, Colesbourne, S.O., Glos., **Seven Springs Rambler,** born 11th May, 1921, bred by Capt. A. Richardson, Seven Springs, Cheltenham; s Harefield Clinker (11000), d Skettleburg Rosie 4th A1 (23572), s d Free Trader (10029).

III. (**£2.**)—MRS. M. PARRY, Talybryn, Bwlch S.O., Breconshire, **Usk Valley Foundation** (12469), born 17th September, 1921; s Sudbourne Albion (11064), d Sudbourne Robuste (24892), s d Acton Crowfoot (9987).

R.—MAJOR D. E. CAMPBELL, D.S.O., Lady's Wood, Malmesbury, **Langham Prime,** born 15th October, 1921, bred by O. H. Smith, Langham, Oakham; s Plumstead Poilu, d Sudbourne Primrose, s d Acton Crowfoot.

CLASS 98.—*Red Poll Bull, calved in* 1922. [1 entry.]

I. (**£10.**)—MAJOR J. G. DUGDALE, Whiteway Farm, Cirencester, **Whiteway Wonder,** born 8th January; s Necton Gloucester (11423), d Manor Hyacinth (25251), s d Acacia (10385).

ABERDEEN-ANGUS.

(£20 towards the Prizes in Classes 99 to 103 were given by the English Aberdeen-Angus Cattle Association and Aberdeen-Angus Breeders).

CLASS 99.—*Aberdeen-Angus Cow or Heifer, in-Milk. calved before 1st December,* 1920. [1 entry.]

I. (**£10.**)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Erica of Bessborough 10th** (59697), born 3rd May, 1917, bred by the Earl of Bessborough, Piltoun, Co. Kilkenny, Ireland; s Elliman of Auchterarder (37602), d Erica of Bessborough 2nd (53771), s d Beauty's Best (26563).

CLASS 100.—*Aberdeen-Angus Heifer, calved on or after 1st December,* 1920. [6 entries.]

I. (**£10.**)—J. J. CRIDLAN, Maisemore Park, Gloucester, **Pride 22nd of Maisemore** (69158), born 7th February, 1921; s George R. of Ballindalloch (30611), d Pride 19th of Maisemore (64341), s d Idyll of Maisemore (36219).

II. (**£5.**)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Esta Erica** (70339), born 5th March, 1921, bred by J. N. Rae, Mounthooly, Rosehearty, Aberdeenshire; s Eventoir of Ballindalloch (36045), d Estimate (64691), s d Evince of Ballindalloch (41555).

III. (**£2.**)—C. T. Scott, Buckland Manor, Broadway, Worcestershire, **Elasticity 2nd of Buckland** (70502), born 5th January, 1921; s Proud George (38595), d Elasticity of Bywell (51787), s d Vellum of Bywell (32650).

R.—Major J. A. Morrison, D.S.O., Basildon Park, Goring, Reading, Berks, **Jezreelita** (70219), born 27th February, 1921, bred by J. McPetrie, Astied, Newdeer; s Earl of Taurus of Ballindalloch (39254), d Jillata (61587), s d Gwy Pa.

H.C.—W. R. Board, Great Frampton, Llantwit Major, Cardiff, **Martha 3rd of Frampton** (68852), born 28th April, 1921; s General Picton (45985), d Martha 5th of Claverdon (51624), s d Gabriel of Esholt (24502).

Class 101.—*Aberdeen-Angus Heifer, calved on or after 1st December,* 1921. [9 entries.]

I. (**£10.**)—C. T. Scott, Buckland Manor, Broadway, Worcestershire, **Elluma 2nd of Buckland** (72814), born 2nd December, 1921; s Etrurian of Bleaton (41498), d Elluma 3rd (42443), s d Euthalito (21896).

II. (**£5.**)—Major J. A. Morrison, D.S.O., Basildon Park, Goring, Reading, Berks, **Elane of Basildon** (72410), born 24th December, 1921; s Baron Eros of Bleaton (47225), d Eulogy of Harviestoun (58608), s d Electric Bell (29104).

III. (**£2.**)—Alderman F. H. Turnbull, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Black Bara** (70968), born 24th January, 1922, bred by D. M. Allan, Ballintomb, Grantoun-on-Spey; s Evendale of Bleaton (48139), d Blackskin of Ballintomb (53609), s d George R. of Ballindalloch (30611).

R.—J. J. Cridlan, Maisemore Park, Gloucester, **Jet 2nd of Maisemore** (71427), born 12th April, 1922; s George R. of Ballindalloch (30611), d Jet of Maisemore (66762), s d Evercalm (33167).

V.H.C.—C. T. Scott, Buckland Manor, Broadway, Worcestershire, **Pride of Buckland** (72818), born 10th December, 1921; s Proud George (38595), d Missy of Buckland (59120), s d Password of Benton (34954).

H.C.—W. R. Board, Great Frampton, Llantwit Major, Cardiff, **Daphne 2nd of Frampton** (71159), born 16th December, 1921; s General Picton (45985), d Daphne 2nd of Apethorpe (61792), s d Comely Kaid (35674).

C.—J. J. Cridlan, **Evergreen 93rd** (71425), born 1st May, 1922; s George R. of Ballindalloch (30611), d Evergreen 58th (66747), s d Evercalm (33167).—Alderman F. H. Turnbull, J.P., **Euretta of Ballintomb** (70971), born 3rd March, 1922, bred by D. M. Allan, Ballintomb, Grantoun-on-Spey; s Pundit of Moyness (49137), d Euretta of Whitside 5th (67096), s d Gironda of Ballindalloch (41659).

Class 102.—*Aberdeen-Angus Bull, calved before 1st December,* 1921. [3 entries.]

I. (**£10.**)—C. T. Scott, Buckland Manor, Broadway, Worcestershire, **Etrurian of Buckland** (45802), born 1st December, 1918; s Etrurian of Bleaton (41498), d Elasticity of Bywell (51787), s d Vellum of Bywell (32650).

II. (**£5.**)—J. J. Cridlan, Maisemore Park, Gloucester, **Everdear of Maisemore** (45859), born 8th February, 1919; s Evercalm (33167), d Evergreen 39th (58018), s d Black Boy of Maisemore (35554).

III. (**£2.**)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llanwit Major, near Cardiff, **Proud Padre** (51422), born 28th March, 1921, bred by J. F. Cumming, Kinermony, Aberlour, Scotland ; s Bandsman of Inchgower (44967), d Princely Pride (49947), s d Every Effort (28043).

CLASS 103.—*Aberdeen-Angus Bull, calved on or after 1st December, 1921.* [4 entries.]

I. (**£10.**)—C. T. SCOTT, Buckland Manor, Broadway, Worcestershire, **Rufus of Buckland** (53693), born 12th December, 1921 ; s Proud George (38595), d Ruth of Buckland 3rd (65764), s d Etrurian of Bleaton (41498).

II. (**£5.**)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Pranksome** (53401), born 3rd March, 1922, bred by Brig.-General Lord Saltoun, C.M.G., Philorth, Fraserburgh, Aberdeenshire ; s Boswick (47284), d Drimmie's Pride (68122), s d Beholder of Ballindalloch (42835).

III. (**£2.**)—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks, **Earl of Basildon** (52224), born 4th April, 1922 ; s Baron Eros of Bleaton (47225), d Endive of Bywell (57613), s d Velindre (37062).

R.—J. J. CRIDLAN, Maisemore Park, Gloucester, **Just George of Maisemore** (53023), born 13th December, 1921 ; s George R. of Ballindalloch (30611), d Jilt 7th of Maisemore (64339), s d Prince of Salem (31112).

CHAMPION PRIZES.

GIVEN BY THE ABERDEEN-ANGUS CATTLE SOCIETY.

A Silver Medal for the best Animal in Classes 99 *to* 103.

I.—C. T. SCOTT, Buckland Manor, Broadway, Worcestershire, **Etrurian of Buckland** (45802), born 1st December, 1918 ; s Etrurian of Bleaton (41498), d Elasticity of Bywell (51787), s d Vellum of Bywell (32650).

R.—C. T. SCOTT, **Rufus of Buckland** (53693), born 12th December, 1921 ; s Proud George (38595), d Ruth of Buckland 3rd (65764), s d Etrurian of Bleaton (41498).

GIVEN BY THE ENGLISH ABERDEEN-ANGUS CATTLE ASSOCIATION.

A Silver Medal for the best Animal of opposite sex.

I.—J. J. CRIDLAN, Maisemore Park, Gloucester, **Pride 22nd of Maisemore** (69158), born 7th February, 1921 ; s George R. of Ballindalloch (30611), d Pride 19th of Maisemore (64341), s d Idyll of Maisemore (36219).

R.—C. T. SCOTT, Buckland Manor, Broadway, Worcestershire, **Elluma 2nd of Buckland** (72814), born 2nd December, 1921 ; s Etrurian of Bleaton (41498), d Elluma 3rd (42443), s d Euthalito (21896).

GIVEN BY THE ARGENTINE ABERDEEN-ANGUS ASSOCIATION.

A Silver Medal for the best Animal in Classes 99 *to* 103 *bred by the Exhibitor.*

I.—C. T. SCOTT, Buckland Manor, Broadway, Worcestershire, **Etrurian of Buckland** (45802), born 1st December, 1918 ; s Etrurian of Bleaton (41498), d Elasticity of Bywell (51787), s d Vellum of Bywell (32650).

R.—J. J. CRIDLAN, Maisemore Park, Gloucester, **Pride 22nd of Maisemore** (69158), born 7th February, 1921 ; s George R. of Ballindalloch (30611), d Pride 19th of Maisemore (64341), s d Idyll of Maisemore (36219).

BRITISH FRIESIAN.

£28 6s. 8d. towards the Prizes in Classes 104 to 108 were given by the British Friesian Cattle Society, and animals entered must have been registered in the B.F.S. Herd Book proper, those registered in the Supplementary Section not being eligible).

CLASS 104.—*British Friesian Cow or Heifer, any age, in-Milk* [13 entries.]

I. (£10.)—G. HOLT-THOMAS, Northdean House, Hughenden, High Wycombe, Bucks, **Northdean Meibloem P.I.** (47738), born 25th June, 1920 ; s Dell Hollander P.I. (7655), d Moordale (imported) Meibloem (18708), s d Max (5899).

II. (£5.)—A. & J. BROWN, Haydon Hill, Aylesbury, **Hedges Bles Fairy** (45856), born 14th January, 1920 ; s Petygards (imported) Bles Albert (4321), d Cymric Fairy (7154).

III. (£2.)—A. & J. BROWN, **Moss Peggy**, born 26th September, 1916, bred by Miss M. Taylor, Moss Side, Greenock Road, Paisley ; s Moss (imported) Adema 49th (4223), d Moss Pearl (18716), s d Moss Beaumont (541).

R.—G. HOLT-THOMAS, **Colton Sunray** (32650), born 31st October, 1918, bred by H. Brown, Colton Mains, Dumfermline ; s Terling (imported) Vic Bertus (4541), d Colton Sunset (6868), s d Colton Puritan (95).

V.H.C.—E. FURNESS, Hamel's Park, Buntingford, Herts, **Hamel's Ympca** (39316), born 5th October, 1919 ; s Dunninald Gaatsomairschaap (6175), d Dunninald Cecile (7522), s d Dunninald Agility (1165).

H.C.—E. FURNESS, **Knebworth Ynte's Billah** (46554), born 7th June, 1920, bred by W. and R. Wallace, Knebworth, Herts ; s Kingswood (imported) Ynte (4047), d Dorney Billah (20752), s d Greenhill Prince (1377).—J. LEWIS, Glasfryn Park, St. Clears, Carmarthenshire, **Rhydbroughton Bramble** (30634), born 9th May, 1917, bred by R. Williamson, Rhydbroughton Farm, Wrexham ; s Blackmore Giant (2369), d Blackmore Bramble (14016), s d Blackmore Boss (949).

CLASS 105.—*British Friesian Heifer, not in-Milk, calved in* 1921 [12 entries.]

I. (£10.)—G. HOLT-THOMAS, Northdean House, Hughenden, Bucks, **Northdean Bonnie Annie** (55600), born 21st March ; s Dell Hollander P.I. (7655), d Hedges Bonnie Annie (1698), s d Hedge Hawkrigg Duke (293).

II. (£5.)—A. Allen, The Manor, Chesterblade, Somerset, **Glen Werribee** (52964), born 15th April; s Dunninald Gaatsomairschaap (6175), d Fingringhoe Walnut (21080), s d Moordale Victor (1809).

III. (£2.)—A. Allen, **Glen Beauty** (52952), born 30th March; s Dunninald Gaatsomairschaap (6175), d Glen Blossom (24682), s d Hedges Footprint (2803).

R.—A. & J. Brown, Haydon Hill, Aylesbury, **Hedges Albert's Dorrit** (53456), born 24th April; s Petygards (imported) Bles Alberts (4321), d Dell Dorritt (28216), s d Garton (imported) Bravo (3895).

V.H.C.—G. T. Eaton, Thurston Hall, Framfield, Sussex, **Thurston Karel Stephanotis,** born 15th February; s Kirkhill (imported) Karel 2nd (4051), d Gorstage Gloaming 2nd (14854), s d Gorstage Graaf (1361).

H.C.—D. G. Hall, Gwentland, Penarth, Glam., **Malmesbury Perfection** (55050), born 28th January, bred by Lieut.-Col. L. E. Morrice, D.S.O., The Priory, Malmesbury; s Wychnor Councillor (10885), d Anthronhall Gipsy (5320)— s d Cradlehall Prince (1135).

C.—J. & B. M. Dale, Felhampton Court, Church Stretton, Salop, **Felhampton Delight,** born 21st February; s Marsh (imported) Generaal (4157), d Felhampton Anne (20978), s d Reddown Murk.

Class 106.—*British Friesian Heifer, calved in* 1922. [11 entries.]

I. (£10.)—G. T. Eaton, Thurston Hall, Framfield, Sussex, **Thurston Karel Verbena,** born 15th February; s Kirkhill (imported) Karel 2nd (4051), d Petygards Ciros (26080), s d Petygards (imported) Bles Albert (4321).

II. (£5.)—A. & J. Brown, Haydon Hill, Aylesbury, **Hedges Gracious Busela,** born 8th June; s Hedges Busk (9873), d Hedges Gracious Dutch (24962), s d Hedges (imported) Fokke 2nd (3993).

III. (£2.)—E. Furness, Hamel's Park, Buntingford, Herts, **Hamel's Empress**, born 26th March; s Dunninald Gaatsomairschaap (6175), d Pomona Queen (26192), s d Cradlehall (imported) Hollander 2nd (3737).

R.—G. T. Eaton, **Thurston Joyinrypschaap,** born 15th January; s Seaton (imported) Roland (10593), d Dunninald Joyinrypschaap (38560), s d Dunninald (imported) Cesar 2nd (3813).

V.H.C.—C. W. H. Glossop, Lund, near Beverley, East Yorkshire, **Longford Carnation,** born 17th January, bred by Longford Farms, Ltd., Derby; s Beccles (imported) Lodewijh (3501), s d Eastern Carnation (33146), s d Bulkeley Max (4917).

H.C.—G. Holt-Thomas, Northdean House, Hughenden, Bucks, **Northdean Wilhelminchen 2nd,** born 7th March; s Dell Hollander P.I. (7655), d Wigginton Wilhelminchen (23154), s d Wigginton Laird (2227).

C.—Miss A. Guest, Inwood, Templecombe, **Inwood Joylight,** born 2nd August; s Rochford (imported) Johan (4399), d Rochford Gaslight 3rd (30694), s d Rochford (imported) Johan (4399).

CLASS 107.—*British Friesian Bull, calved in or before* 1921. [4 entries.]

I. (£10.)—G. HOLT-THOMAS, Northdean House, Hughenden, Bucks, **Northdean** (imported 1922) **Marthus Beatty**, born 26th November, 1921, bred by E. J. Webb & Sons, Benchfield, Tweesprint, O.F.S.; s Admiral Beatty (987 S.A.S.B.), d Martha of Kopjeskraal (1597 S.A.S.B.), s d Adolf (256 S.A.S.B.).

II. (£5.)—A. ALLEN, The Manor, Chesterblade, Shepton Mallet, **Kingswood Ynte Series** (14531), born 17th June, 1920, bred by H. Heel, Worthing, Sussex; s Hedges Second Series (6427), d Kingswood Gem (25202), s d Kingswood (imported) Ynte (4047).

III. (£2.)—J. & B. M. DALE, Felhampton Court, Church Stretton, Salop, **Bulkeley Klaske's Second Ceres**, born 2nd July, 1919, bred by J. B. and H. L. Jarmay, Bulkeley Hall, Malpas, Cheshire; s Bulkeley (imported) Mietje's Ceres (3625), d Bulkeley (imported) Klaske 5th (17118), s d De Hoop.

R.—MISS A. GUEST, Inwood, Templecombe, **Dunninald Rijpmaster** (16777 P.I.), born 12th July, 1921, bred by Executors of Major D. Spense, V.D.; s Seaton Roland P.I. (10593), d Inwood (imported) Rijpma 10th (18156), s d De Verwachling 2nd (4429 F.R.S.).

CLASS 108.—*British Friesian Bull, calved in* 1922. [4 entries.]

I. (£10.)—G. T. EATON, Thurston Hall, Framfield, Sussex, **Thurston Karel Khedive**, born 11th February; s Kirkhill (imported) Karel 2nd (4051), d Buckingham Berry 3rd (23754), s d Bendrose Boss (2351).

II. (£5.)—C. W. H. GLOSSOP, Lund, near Beverley, East Yorkshire, **Lund** (imported 1922) **Rensche's Beatty**, born 28th May, bred by A. A. Kingwell, Colonies Plaats, Graff Reinet, South Africa; s Nebs Rust Beatty (260 F.H.B.), d Haydon (imported 1922) Rensche, s d Bedford Pel Knol 2nd (471 S.A.S.B.).

III. (£2.)—J. AND B. M. DALE, Felhampton Court, Church Stretton, Salop, **Felhampton Elect**, born 8th May; s Bulkeley Klaske's Second Seres (11187), d Felhampton Blossom (38808), s d Marsh (imported) Generaal (4157).

WELSH BLACK.

(£25 of the Prizes in Classes 109 to 113 were given by or through the Welsh Black Cattle Society and animals must have been registered or eligible for registration in the Welsh Black Cattle Society's Herd Book).

CLASS 109.—*Black Welsh Cow or Heifer, in-Milk, calved on or before November 30th,* 1920. [4 entries.]

I. (£10.)—R. M. GREAVES, Wern, Portmadoc, North Wales, **Wern Pearl** (2592), born 20th March, 1916; s Wern Nonsuch (715), d Wern Fortress (739), s d Wern Defender (45).

II. (£5.)—SIR G. A. E. T. G. MEYRICK, BART., Hinton Admiral, Christchurch, Hants, **Bodelwa Shan 3rd**, born 14th December, 1919, bred by O. E. Hughes, Bodelwa, Tycroes, Isle of Anglesey; s Bodelwa Volunteer, d Bodelwa Shan 2nd, s d Ap Major.

CLASS 110.—*Welsh Black Heifer, calved on or between December 1st, 1920, and November 30th,* 1921. [3 entries.]

I. (£10.)—N. L. MOON, Llandrillo, Merionethshire, North Wales, **Corwen Madge,** born 11th September, 1921; s Du Rosyn (1326), d Eluned 2nd (3730), s d Glyndwr (899).

II. (£5.)—SIR G. A. E. T. G. MEYRICK, BART., Hinton Admiral, Christchurch, Hants, **Bodelwa Sally 2nd,** born 4th December, 1920, bred by O. E. Hughes, Bodelwa, Tycroes, Isle of Anglesey; s Bodelwa Volunteer, d Bodelwa Mona Bach, s d Penrhos Yswain.

III. (£2.)—R. M. GREAVES, Wern, Portmadoc, North Wales, **Wern Agate,** born 12th February, 1921; s Wern Roamer (536), d Wern Pearl (2592), s d Wern Nonsuch (715).

CLASS 111.—*Welsh Black Heifer, calved on or between December 1st, 1921, and November 30th,* 1922. [6 entries.]

I. (£10.)—N. L. MOON, Llandrillo, Merionethshire, North Wales, **Corwen Menna,** born 1st January, 1922; s Du Rosyn (1326), d Penmynydd Menna (2288), s d Penmynydd Tegid (487).

II. (£5.)—ALLEN & ROGERS, Halford Farm, Craven Arms, Salop, **Bryniog 2nd of Halford,** born 3rd March, 1922; s Trefor Togo (1483), d Bryniog 14th (3795), s d Wern Quota (993).

III. (£2.)—R. M. GREAVES, Wern, Portmadoc, North Wales, **Wern Bluebell,** born 5th May, 1922; s Wern Sentry (1542), d Wern Pansy (2593), s d Wern Nonsuch.

R.—W. A. JUKES, Snowshill Hill, Moreton-in-Marsh, Glos., **Cotswold Snowdrop,** born 13th May, 1922; s Trefor Caradoc (1481), d Yokehouse Buttercup (4568), s d Boduikoedd Emperor (727).

H.C.—W. A. JUKES, **Cotswold Delilah,** born 2nd June, 1922; s Pennarth Madoc (1450), d Madryn Delilah 2nd (2949), s d Madryn Corinthian (492).

CLASS 112.—*Welsh Black Bull, calved on or before November 30th,* 1921. [3 entries.]

I. (£10.)—R. M. GREAVES, Wern, Portmadoc, North Wales, **Wern Sentry** (1542), born 20th September, 1919; s Snowdon Idwal (1192), d Wern Ideal (1280), s d Duke of Wellington (294).

II. (£5.)—E. & R. DAVIES, Lammaston, Lamphey, Pembroke, **Duke 2nd** (1220), born 7th October, 1917, bred by J. Williams, Eithinduon, Mydrim; s Wellington (1212), d Lass (1525), s d Duke (405).

CLASS 113.—*Welsh Black Bull, calved on or between December 1st, 1921, and November 30th,* 1922. [4 entries.]

I. (£10.)—SIR G. A. E. T. G. MEYRICK, BART., Hinton Admiral, Christchurch, Hants, **Ap Volunteer,** born 2nd December, 1921, bred by O. E. Hughes, Bodelwa, Tycroes, Isle of Anglesey; s Bodelwa Volunteer (1273), d Bodelwa Mair 2nd (2679).

II. (**£5.**)—R. M. GREAVES, Wern, Portmadoc, North Wales, **Penllyn Prince,** born 18th February, 1922, bred by O. Williams, Penystumllyn, Criccieth; s Hotspur of Penrhyn (1689), d Penllyn Lowri 8th (5572).

JERSEY.

(The Prizes in Class 114 were given by the English Jersey Cattle Society).

CLASS 114.—*Jersey Cow or Heifer, in-Milk, entered in or eligible for entry in the English Jersey Herd Book, sired in Great Britain or Ireland.* [6 entries.]

I. (**£5.**)—R. BRUCE WARD, Godinton, Ashford, Kent, nearly whole, **Ida,** born 14th March, 1914, bred by Major Baldwin, Alvechurch, Worcestershire; s Antidote (10843), d Matilda, s d Marshal MacMahon (9693).

II. (**£3.**)—R. BRUCE WARD, whole, **Prometheus' Queen,** born 20th November, 1919; s Prometheus (13391), d Mulcaster's Queen, s d Mulcaster (12399).

III. (**£2.**)—MAJOR A. W. HUNTINGTON, Wellesbourne House, Warwick, broken, **Patience,** born 14th January, 1920, bred by R. B. Ward, Godinton, Ashford, Kent; s Prometheus (13391), d Mannett.

CLASS 115.—*Jersey Cow, in-Milk, calved before* 1920. [7 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, nearly whole, **Ida,** born 14th March, 1914, bred by Major Baldwin, Alvechurch, Worcestershire; s Antidote (10843), d Matilda, s d Marshal MacMahon (9693).

II. (**£5.**)—MRS. HARRY BRIGGS, The Grange, North Stoke, Wallingford, Berks, whole, **Petune's Victory,** born 26th August, 1918, bred by R. Hervé, St. Lawrence, Jersey; s Petune's Lad (5458 P.S.C.), d Running Water, s d Anemone's Ledas Lad (5204 P.S.H.C.).

III. (**£2.**)—E. A. STRAUSS, M.P., Kingston House, Abingdon, Berks, whole, **Derry's Fairy,** born 16th May, 1916, bred by J. Barette, St. Brelades, Jersey; s Belinda's Golden Jolly, d Tombette Lady.

R.—G. CROSS, Smart's Hill House, Penhurst, Kent, whole, **Eastern Queen Laxton,** born 15th February, 1917, bred by J. A. Gibaut, Trinity, Jersey; s Dame's Gamboge, d Western Queen Laxton, s d Western King.

CLASS 116.—*Jersey Cow or Heifer, in-Milk, calved in* 1920. [4 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, whole, **Mistress Lace,** born 25th March, 1920: s Masterman of Oaklands (13020), d Fine Lace, s d Fern's Oxford Noble (11684).

II. (**£5.**)—G. CROSS, Smart's Hill House, Penhurst, Kent, broken, **Bergere's Molly,** born 16th April, bred by J. P. Lucas, Jersey; s Milton's Interested Lad, d Bergere's Fly, s d Leda's Golden Lad.

III. (**£2.**)—MAJOR A. W. HUNTINGDON, Wellesbourne House, Warwick, whole, **Cowslip's Pet,** born 12th March, bred by E. J. Vibert, St. Ouen, Jersey; s General Cowslip, d Leo Jardins Pet 4th, s d Jelliner Farmint Warrior.

R.—MAJOR A. W. HUNTINGTON, broken, **Patience,** born 14th January, 1920, bred by R. B. Ward, Godinton, Ashford, Kent; s Prometheus (13391), d Mannett.

CLASS 117.—*Jersey Heifer, in-Milk, calved in or since* 1921. [4 entries.]

I. (**£10.**)—E. A. STRAUSS, M.P., Kingston House, Abingdon, Berks, whole, **Kingston Amira,** born 12th April, 1921; s Knight of Beechwood, d Gipsy Amira, s d Hamptonne Grey.

II. (**£5.**)—C. L. HILL, Harptree Court, East Harptree, whole, **Harptree Lady,** born 12th March, 1921; s Beuvelands Emperor, d Gay Lady's Lorraine, s d Merryweather.

III. (**£2.**)—R. BRUCE WARD, Godinton, Ashford, Kent, whole, **Marietties Lass,** born 6th June, 1921, bred by Fowler & de la Perelle, Southampton; s Sybil's Gamboge 4th (14134), d Mariette, s d Profiteer (13390).

CLASS 118.—*Jersey Bull, calved before* 1921. [5 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, nearly whole, **Pilgrim** (13699), born 14th April, 1919; s Prometheus (13391), d Evergreen, s d Catillon's Prince (11639).

II. (**£5.**)—C. L. HILL, Harptree Court, East Harptree, whole, **Wotton Aster,** born 29th August, 1920, bred by Mrs. Evelyn, Wotton House, Dorking; s Wotton Beautious Cloud, d Wotton Panquerette, s d Illustrious.

III. (**£2.**)—F. B. IMBERT-TERRY, Blue Hayes, Broadclyst, Devon, whole, **Blue Hayes Red Candy,** born 27th December, 1920; s Hotspur (12607), d Catherine (Vol. 30, p. 244), s d Royal Castle.

CLASS 119.—*Jersey Bull, calved in* 1921. [5 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, broken, **Canterbury Pilgrim,** born 9th April; s Pilgrim (13699), d Caper, s d Capsicum (10892).

II. (**£5.**)—MAJOR A. W. HUNTINGTON, Wellesbourne House, Warwick, light fawn, **Bombay's Lad 2nd,** born 1st March, bred by Lady Ludlow, Luton Hoo, Luton, Beds; s Fairy Lad, d Bombay's Pet 4th.

III. (**£2.**)—MRS. E. WATTS, Eastwood Park, Falfield, Glos., broken, **Golden Bracken** (13957), born 16th January, bred by H. Walker, Sneyd Park, Bristol; s Lizzie's Boy (13639), d Fairy Queen's Fern (Vol. 25, p. 327), s d Golden Fern's Noble (10626).

R. & H.C.—W. H. RENWICK, Pontcanna House, Cardiff, whole, **Pontcanna Billy,** born 30th June; s Wotton Beautious Cloud, d Tilly, s d Queenie's Star.

H.C.—WADHURST FARMS, LTD., Wadhurst Castle, Sussex, broken, **Holmwood Milkman,** born 7th August, bred by A. L. Hordern, Holmwood Lodge, Dorking; s Rapkyns' Black Knight, d Kathleen's Milkmaid, s d Golden Fern's Dairyman.

CLASS 120.—*Jersey Bull, calved in* 1922. [5 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, whole, **My Pilgrim,** born 7th May; s Pilgrim (13699), d Mistress Mine, s d Masterman of Oaklands (13020).

II. (**£5.**)—Mrs. E. Watts, Eastwood Park, Falfield, Glos., broken, **Eastwood Slashing Sultan,** born 26th June; s The Slasher (14143), d Calveley Marion (Vol. 33, p. 284), s d Marionette's Boy (12702).

III. (**£2.**)—E. A. Strauss, M.P., Kingston House, Abingdon, Berks., whole, **Lamplighter,** born 9th May, bred by J. Du Val, St. Peter, Jersey: s Broadlands Son, d Kitty's Belle Blonde, s d Blonde's Golden Oxford.

R. & V.H.C.—C. L. Hill, Harptree Court, East Harptree, broken, **Wotton Orson,** born 15th June, bred by Mrs. Evelyn, Wotton House, Dorking; s **Wotton Airman,** (14171), d Valentine (Vol. 24, p. 434), s d Davenport (10211).

H.C.—G. Cross, Smart's Hill House, Penshurst, Kent, whole, **Penshurst Yellow Prince,** born 7th May; s Marigold's Prince, d Yellow Wort, s d Wotton Red Fox.

GUERNSEY.

(£20 towards the Prizes in the Guernsey Classes were given by the English Guernsey Cattle Society).

Class 121.—*Guernsey Cow, in-Milk, calved before* 1920. [5 entries.]

I. (**£10.**)—A. C. Beatty, Calehill Park, Little Chart, fawn and white, **Lily of L'Amuone** (17777) (P.S. 14555), born 25th October, 1917, bred by L. F. Wheadonm, La Coterie, St. Peter's, Guernsey; s May Boy of Mont Plaisant (3862 P.S., R.G.A.S.), d Lily of L'Aumone (14527 P.S.), s d Honoria's Sequel 2nd (2816 P.S.).

II. (**£5.**)—Mrs. R. C. Bainbridge, Elfordleigh, Plympton, Devon, fawn and white, **Tregonning Lucky,** born 30th August, 1918, bred by G. Blight, Tregonning, Cornwall; s Tregonning Masher 4th (3423), d Imp. Gipsy Girl 2nd (8961), s d Captain Ite (1815 P.S.).

Class 122.—*Guernsey Heifer, in-Milk, calved in* 1920. [4 entries.]

I. (**£10.**)—J. B. Body, Hindhead Court, Hindhead, red and white, **Tregye Cloud,** born 29th August, bred by Lady M. Boscawen, Tregye, Cornwall; s Lynchmere Lord Roberts 13th, d Tregye Mist, s d Jupiter.

II. (**£5.**)—Mrs. Jervoise, Herriard Park, Basingstoke, fawn and white, **Herriard May Lady** (15448), born 23rd January; s Herriard Governor 2nd (2977), d Ville au Roi May Lady (11795), s d May Rose Lord Mar (3155 P.S., R.G.A.S.).

III. (**£2.**)—Mrs. R. C. Bainbridge, Elfordleigh, Plympton, Devon, fawn and white, **Nancothan Preel 3rd** (15657), bred by J. Kitchen, Buryas Bridge, Cornwall; s Gears Knight (3712), d Trewidden Pree 4th (8772), s d Godolphin Arthur.

R.—Mrs. R. C. Bainbridge, fawn and white, **Elfordleigh Empress,** born 1st May; s Trequean Emperor (3609), d Trequean Daisy 3rd (8287), s d Trequean Pete (2677).

Class 123.—*Guernsey Heifer, calved in* 1921. [2 entries.]

I. (**£10.**)—J. B. Body, Hindhead Court, Hindhead, fawn and white, **Morland Lady Richmond,** born 15th February, bred by G. F. Ferrand, Morland Hall, Alton; s Slogan's Climax, d Richmond's Zoe of l'Ruette, s d Ivy's Emblem.

II. (£5.)—LIEUT.-COL. THE HON. G. LAWRENCE, D.S.O., Hill Farm, Oaksey, Wilts, red, fawn and white, **Hawes Farm Gwendolen,** born 27th February, bred by Sir H. F. Lennard, Bart., Wickham Court, West Wickham, Kent; s Wickham Field-Marshal (3840), d Gwendolen 2nd of Warren Wood (8990), s d Lake Rustic (1956).

CLASS 124.—*Guernsey Heifer, calved in* 1922. [9 entries.]

I. (£10.)—LORD POLTIMORE, Court Hall, North Molton, North Devon, fawn and white, **Buttercup 4th of Myrtle Place,** born 19th February, bred by E. de Garis, Myrtle Place, Castel, Guernsey; s Queen's Fancy (4038 P.S.), d Buttercup of Myrtle Place (14337 P.S.), s d Prince of La Croisse (3213 P.S.).

II. (£5.)—MRS. JERVOISE, Herriard Park, Basingstoke, fawn and white, **Herriard Lady Buller 4th,** born 9th May; s Sarnias Oasis 2nd (4308), d Lady Buller 3rd (15446), s d May Rose's Billy 2nd of the Masse (3758).

III. (£2.)—MRS. JERVOISE, fawn and white, **Flower Girl 2nd of Myrtle Place,** born 6th September, bred by E. de Garis, Myrtle Place, Castel, Guernsey; s Noble Boy of Myrtle Place (4336 P.S., R.G.A.S.), d Flower Girl of Myrtle Place (19539 P.S., R.G.A.S.), s d Valentine's Honour of the Passée (3826).

R.—J. B. BODY, Hindhead Court, Hindhead, fawn and white, **Hindhead Princess Miriam,** born 21st April; s Lynchmere Lord Roberts 15th, d Claremont, Miriam, s d Duvaux Gift.

H.C.—G. P. SANDAY, Puddington Hall, Neston, Cheshire, fawn and white, **Puddington Daffodil.** born 9th January; s Lively's Honour of Les Quartiers, d Ravenscroft Daffodil 2nd, s d Gladiator.

C.—J. B. BODY, fawn and white, **Hindhead Princess Rosy,** born 4th May: s Lynchmere Lord Roberts 15th, d Lynchmere Rosy, s d Delight 2nd.

CLASS 125.—*Guernsey Bull,* calved in 1919 *or* 1920. [5 entries.]

I. (£10.)—MRS. R. C. BAINBRIDGE, Elfordleigh, Plympton, Devon, fawn and white, **Elfordleigh Hammill,** born 4th May, 1920; s Hammill of Marazion (3334), d Trequean Maggie 3rd (11772), s d Trequean Arthur (2675).

II. (£5.)—J. B. BODY, Hindhead Court, Hindhead, fawn and white, **Hindhead Peter,** born 4th August, 1920; s Bicton Plumbago, d Bighton Nacre, s d Bighton Spinel.

III. (£2.)—LORD POLTIMORE, Court Hall, North Molton, North Devon, fawn and white, **Pearl's Majestic** (3999), born 27th April, 1919, bred by Mrs. T. Le Prevost, L'Etiennerie, Castel, Guernsey; s Queen's Fancy (4038 P.S., R.G.A.S.), d Nicolle's Pearl (16975 P.S., R.G.A.S.), s d Governor's Pearl (3428 P.S., R.G.A.S.).

R.—A. C. BEATTY, Calehill Park, Little Chart, Kent, red and white, **Murrell Golden Cheer** (3993), born 1st April, 1919, bred by Mrs. W. H. Palmer, Heathlands, Wokingham; s Murrell Lord Roberts (3375), d Murrell Golden Cheery (10223), s d Hayes Fido 2nd (2460).

H.C.—A. PEAKE, Coton, Cambs., fawn and white, **Golden Noble of New Volante,** born 8th April, 1919, bred by W. Le Ruez, New Volante, St. Saviour's, Guernsey; s Admiral des Ruettes (3839), d Fanny of La Maison (4150), s d Dick of Rocher 2nd (1328).

CLASS 126.—*Guernsey Bull, calved in* 1921. [1 entry.]

I. (£10.)—LORD POLTIMORE, Court Hall, North Molton, North Devon, fawn and white, **Royal of Beaulieu** (4655 P.S.), born 18th May, bred by J. J. Gavet, Beaulieu St. Andrew, Guernsey; s May Boy of Beaulieu (4300 P.S.), d Margaret 2nd of Beaulieu (14292 P.S., A.R., 383), s d Flora's Sequel 2nd of Vimiera (2921 P.S.).

CLASS 127.—*Guernsey Bull, calved in* 1922. [5 entries.]

I. (£10.)—MRS. R. C. BAINBRIDGE, Elfordleigh, Plympton, Devon, fawn and white, **Elfordleigh Emperor,** born 24th May; s Elfordleigh Hammill (4185), d Elfordleigh Empress (15310), s d Trequean Emperor.

II. (£5.)—LIEUT.-COL. THE HON. G. LAWRENCE, D.S.O., Hill Farm, Oaksey, Wilts, fawn and white, **Lord Guilbert of Orpington 4th,** born February, bred by Mrs. Trouton, The Rookery, Doune, Kent; s Lord Guilbert of Corneilles (3978), d Barbara of Clairmont (14048), s d Raymond of Mont Plaisant (3571).

III. (£2.)—J. B. BODY, Hindhead Court, Hindhead, fawn and white, **Hindhead Polly's Governor,** born 1st July: s Governor 4th des Ruettes, d Polly of the Isles of Goodnestone 3rd, s d Rose Lad of Goodnestone.

R.—G. P. SANDAY, Puddington Hall, Neston, Cheshire, fawn and white, **Puddington Valentine,** born 1st January; s Lively's Honour of Les Quartiers, d Lily 3rd of Mont Plaisant, s d Raymond of Mont Plaisant.

H.C.—LORD POLTIMORE, Court Hall, North Molton, North Devon, fawn and white, **Poltimore Silver King,** born 19th April; s Pearl's Majestic (3999), d Molly 2nd of Les Blancs Bois (14609], s d Prince of Les Blanc Bois (3803 P.S., R.G.A.S.).

DEXTER.

CLASS 128.—*Dexter Cow or Heifer, in-Milk, calved in or before* 1920 —[6 entries.]

I. (£10.)—E. DAVIES, Oaklands, Brecon, red, **Bryn Golden Red** (2720), born 10th February, 1918, bred by the late Wm. Haines, The Bryn, Penpergrom, Abergavenny; s Oakridge Dane (571), d Bryn Sinfi (2007), s d Barrow Comet (421).

II. (£5.)—A. C. KING, Braishfield Manor, Romsey, Hants, black, **Braishfield Black Tulip** (2851), born 28th September, 1920; s Black Mark (643), d Braishfield Bloom (2300), s d Home Rule (563).

III. (£2.)—LADY K. HARE, Brokenhurst Park, Brokenhurst, black, **Brokenhurst Woodbine** (2711), born 9th February, 1920; s Brokenhurst Rufus (601), d Gort Woodbine 7th (2498), s d Gort Fred (5691).

R.—W. L. EVERARD, Ratcliffe Hall, Leicester, black, **Fillongley Forest Flower,** born 9th September, 1920, bred by Mrs. H. J. Nutt, Hampton-in-Arden, Warwickshire; s Fillongley Forester (630), d Fillongley Freesia (2491).

H.C.—W. L. WOOD, Frensham Beale Manor, Frensham, Surrey, black, **Orphan Girl,** born August 12th, 1916, bred by Major the Hon. Sir J. H. Ward; s Barrow Orphan (498), d Chilton Girl (1859), s d La Mancha Simple Paddy (482).

CLASS 129.—*Dexter Heifer, calved in* 1921 *or* 1922. [9 entries.]

I. (£10.)—W. L. EVERARD, Ratcliffe Hall, Leicester, black, **Fillongley Forest Footprint,** born July 28th, 1921, bred by Mrs. H. J. Nutt, Hampton-in-Arden, Warwickshire; s Fillongley Forester (630), d Who's Who (2540), s d Barrow Orphan (498).

II. (£5.)—E. DAVIES, Oaklands, Brecon, black, **Pontarfran Patricia,** born 22nd April, 1922; s Pontarfran Rifleman (753), d Pontarfran Patti (2795), s d Brokenhurst Coy Boy (539).

III. (£2.)—LADY K. HARE, Brokenhurst Park, Brokenhurst, Hants, black, **Brokenhurst Tinkle 3rd** (2875), born 31st March, 1921; s Brokenhurst Morella (651), d Brokenhurst Tinkle (2393), s d Oakridge Grandaddy (510).

R.—E. DAVIES, black, **Pontarfran Pierrette,** born 1st August, 1922; s Pontarfran Rifleman (753), d Bryn Sweet (2879), s d Oakridge Dane (571).

V.H.C.—H. G. JONES, Downford, Mayfield, Sussex, red, **Downford Rhoda,** born 27th April, 1921; s Downford Dandy, d Downford Deutzia.

H.C.—H. G. JONES, black, **Downford Diana,** born 25th March, 1921; s Downford Dandy, d Downford Dinah, s d La Mancha Jack Tar.

CLASS 130.—*Dexter Bull, calved in* 1920, 1921 *or* 1922. [7 entries.]

I. (£10.)—LADY K. HARE, Brokenhurst Park, Brokenhurst, Hants, black, **Brokenhurst Philip** (726), born 13th March, 1921; s Brokenhurst Morella (651), d Peach Blossom of Claragh (2535), s d Gort Ned 5th (607).

II. (£5.)—E. DAVIES, Oaklands, Brecon, black, **Pontarfran Rifleman** (753), born 29th January, 1920; s Fillongley Forester (630), d Ardudwy (2381), s d Fillongley Foreman (562).

III. (£2.)—H. G. JONES, Downford, Mayfield, Sussex, black, **Downford Dan,** born 15th April, 1922; s Downford Dandy, d Downford Dinah, s d La Mancha Jack Tar.

R.—W. L. EVERARD, Ratcliffe Hall, Leicester, black, **Fillongley Forest Footpad,** born 21st February, 1922, bred by Mr. H. J. Nutt, Hampton-in-Arden, Warwickshire; s Fillongley Forester (630), d Fillongley Felicite (2328), s d Oakridge Marston Jack.

V.H.C.—MRS. LEATHAM, The Manor, Bagendon, Cirencester, black, **Bagendon Paymaster,** born 23rd April, 1921; s Bagendon Paying Guest, d Bagendon Tortoishell 4th, s d Cowbridge Sunny Boy.

H.C.—J. H. WOOTTON, Byford, near Hereford, red, **Byford Wyeside,** born 11th August, 1921; s Bryn Lavengro, d Byford Ruby.

(The Prizes in Class 131 were given by the English Kerry and Dexter Cattle Society.)

CLASS 131.—*Dexter Bull, calved in* 1922, *whose sire and dam were entered in the English Kerry and Dexter or Royal Dublin Society's Herd Book.* [9 entries.]

I. (£10.)—H. G. JONES, Downford, Mayfield, Sussex, black, **Downford Dan,** born 15th April; s Downford Dandy, d Downford Dinah, s d La Mancha Jack Tar.

II. (**£3.**)—A. C. KING, Braishfield Manor, Romsey, Hants, black, **Braishfield Peachum** (Vol. 23rd), born 4th March; s La Mancha True Blue (703), d Castlelough Peach (2233), s d Plantol (564).

III. (**£2.**)—W. L. EVERARD, Ratcliffe Hall, Leicester, black, **Fillongley Forest Footpad,** born 21st February, bred by Mr. H. J. Nutt, Hampton-in-Arden, Warwickshire; s Fillongley Forester (630), d Fillongley Felicite (2328), s d Oakridge Marston Jack.

R.—E. DAVIES, Oaklands, Brecon, black, **Pontarfran Poilu,** born 14th April; s Pontarfran Rifleman (753), d Patti 2nd (2142), s d Paganini (532).

V.H.C.—E. DAVIES, black, **Pontarfran Pasha,** born 2nd August; s Bagendon Senator (642), d Cowbridge Dainty Annie (2734), s d Cowbridge Dainty Jock (605).

H.C.—J. H. WOOTTON, Byford, near Hereford, red, **Byford Pioneer.** born 22nd March; s Bryn Lavengro, d Byford Primrose.

SPECIAL PRIZE.

GIVEN BY THE ENGLISH KERRY AND DEXTER CATTLE SOCIETY.

The Devonshire Challenge Cup, for the Best Animal in Classes 128 *tp* 131, *bred by Exhibitor, and entered in or eligible for the English Kerry and Dexter Herd Book. The Cup to be won by the same Exhibitor with different animals three years in succession before becoming his absolute property.*

The Certificate of Award of the English Kerry and Dexter Cattle Society will be given to the owner of the winning animal on each occasion the Cup is competed for.

I.—LADY K. HARE, Brokenhurst Park, Brokenhurst, Hants, black, **Brokenhurst Philip** (726), born 13th March, 1921; s Brokenhurst Morella (651), d Peach Blossom of Claragh (2535), s d Gort Ned 5th (607).

R.—A. C. KING, Braishfield Manor, Romsey, Hants, black, **Braishfield Black Tulip** (2851), born 28th September, 1920; s Black Mark (643), d Braishfield Bloom (2300), s d Home Rule (563).

MILK TEST.

CLASS 132.—*Cow, in-Milk, of any breed or cross, under* 950*lbs. live weight, yielding the largest quantity of milk of normal character, containing at each time of milking not less than* 3 *per cent. fat, the period of lactation being taken into consideration.* [27 entries.]

I. (**£10.**)—R. BRUCE WARD, Godinton, Ashford, Kent, whole Jersey, **Prometheus' Queen,** born 20th November, 1919; s Prometheus (13391), d Mulcaster's Queen, s d Mulcaster (12399). (Last calf January 7, 1923).

II. (**£5.**)—G. CROSS, Smart's Hill House, Penhurst, Kent, whole Jersey, **Eastern Queen Laxton,** born 15th February, 1917, bred by J. A. Gibaut, Trinity, Jersey; s Dame's Gamboge, d Western Queen Laxton, s d Western King. (Last calf October 15, 1922).

III. (**£2.**)—MRS. H. BRIGGS, The Grange, North Stoke, Wallingford, Berks, whole Jersey, **Lily of the Valley**, born 26th October, 1917, bred by Mrs. Cottrell Dormer, Coombe, near Woodstock, Oxon.; s King Primrose (12674), d Golden Primrose (Vol. 30, p. 289), s d Rosy's Golden Champion (11523).

CLASS 133.—*Cow, in-Milk, of any breed or cross,* 950*lbs. live weight or over, yielding the largest quantity of milk of normal character, containing at each time of milking not less than* 3 *per cent. fat, the period of lactation being taken into consideration.* [27 entries.]

I. (**£10.**)—W. TURNER, Stonehouse, Hempley, Dymock, Glos., British Friesian, **Hawthorn Agnes**, born 1st October, 1917; s Gorstage Mietjes Victor (imported) (3939), d Spursholt Ragtime (22704), s d Spursholt Rambler (2055).

II. (**£5.**)—G. HOLT-THOMAS, Northdean House, Hughenden, Bucks, British Friesian, **Terling Glossie 5th** (16094), born 8th September, 1913, bred by Lord Rayleigh, Witham, Essex; s Terling Magnus (2139), d Terling Glossie 4th (12484). (Last calf December 3, 1922).

III. (**£2.**)—G. HOLT-THOMAS, Northdean House, Hughenden, High Wycombe, Bucks, British Fresian, **Colton Sunray** (32650), born 31st October, 1918, bred by H. Brown, Colton Mains, Dumfermline; s Terling (imported) Vic Brutus (4541), d Colton Sunset (6868), s d Colton Puritan (95). (Last calf March 22, 1923).

R.—A. AND J. BROWN, Haydon Hill, Aylesbury, British Friesian, **Lacton Ella** (40066), born 28th March, 1919, bred by J. R. Oliver, Manor House, Elsing, East Dereham, Norfolk; s Stanfield Douglas (7041), d Beetley Eva (13972), s d Stanfield Pirate (2109).

H.C.—MRS. W. G. BUSK, Wraxall Manor, Dorchester, Devon, **Wraxall Bluebell** (A543), born 1915, bred by H. Gordie, Chilfrome, Dorchester.—N. D. LUPTON, Chalmington, Dorchester, Dorset, **Devon Daisy** (B729), born 4th July, 1918, bred by H. H. Pearcey, Charlton Rousdon, Lyme Regis; s Stockleigh Rentpayer 2nd (9854). (Last calf, February 1, 1923).—A. AND J. BROWN, Haydon Hill, Aylesbury, British Friesian, **Hedges Dutch Garter** (24948), born 10th November, 1916; s Hedges (imported) Fokke 2nd (3993), d Garton Agnes (8124), s d Stanfield Victor (693). (Last calf, February 4, 1923).

C.—W. D. CHICK, Compton Valence, Frampton, Dorchester, Devon, **Compton Carmine 3rd** (28145), born 27th February, 1913; s Compton Rainbow (7987), d Compton Carmine 2nd (26525), s d Compton Fiddler (6307). (Last calf, November 26, 1922). R. BRUCE WARD, Godinton, Ashford, Kent, nearly whole, Jersey, **Ida**, born 14th March, 1914, bred by Major Baldwin, Alvechurch, Worcestershire; s Antidote (10843), d Matilda, s d Marshal MacMahon (9693). (Last calf, March 19, 1923).

SPECIAL PRIZE.

GIVEN BY THE BRITISH FRIESIAN CATTLE SOCIETY.

To the Owner of the Cow awarded the greatest number of points in Classes 132 *and* 133, *provided that such Cow was a British Friesian.*

I. (**£50.**)—W. TURNER, Stonehouse, Hempley, Dymock, Glos., British Friesian, **Hawthorn Agnes**, born 1st October, 1917; s Gorstage Mietjes Victor (imported) (3939), d Spursholt Ragtime (22704), s d Spursholt Rambler (2055).

BUTTER TEST.

(The Prizes in Class 134 were given by the English Jersey Cattle Society, and in Class 135 by the English Guernsey Cattle Society, and entries in them were subject to any condition issued by these Societies previous to the tests).

CLASS 134.—*Cow, eligible for or entered in the English Jersey Herd Book, obtaining the greatest number of points by the practical test of the separator and churn, judged by the scale of points adopted by the English Jersey Cattle Society.* [8 entries.]

Certificates of Merit were also awarded to Cows under five years old obtaining 30 *points, and to cows five years old or over obtaining* 35 *points.*

I. (Gold Medal or £10.)—G. CROSS, Smart's Hill House, Penhurst, Kent, whole Jersey, **Eastern Queen Laxton,** born 15th February, 1917, bred by J. A. Gibaut, Trinity, Jersey; s Dame's Gamboge, d Western Queen Laxton, s d Western King. (Last calf, October 15, 1922).

II. (Silver Medal.)—E. A. STRAUSS, M.P., Kingston House, Abingdon, Berks, whole Jersey, **Derry's Fairy,** born 16th May, 1916, bred by J. Barette, St. Brelades, Jersey; s Belinda's Golden Jolly, d Tombette Lady. (Last calf, January 22, 1923).

III. (Bronze Medal.)—R. BRUCE WARD, Godinton, Ashford, Kent, whole Jersey, **Prometheus' Queen,** born 20th November, 1919; s Prometheus (13391), d Mulcaster's Queen, s d Mulcaster (12399). (Last calf, January 7, 1923).

CLASS 135.—*Cow, eligible for or entered in the English Guernsey Herd Book, obtaining the greatest number of points by the practical test of the separator and churn, judged by the scale of points adopted by the English Guernsey Cattle Society.* [7 entries.]

I. (£5.)—A. C. BEATTY, Calehill Park, Little Chart, Kent, fawn and white, **Lizette of St. Catherine** (18395 P.S.), born 20th June, 1918, bred by P. C. Roubilliard, St. Catherine's, Guernsey; s Lively Sailor Boy of Les Quartiers (3622 P.S., R.G.A.S.), d Maypole 6th (8582 P.S., R.G.A.S.).

II. (£3.)—A. C. BEATTY, fawn and white, **Lily of L'Aumone** (17777) (P.S. 14555), born 25th October, 1917, bred by L. F. Wheadonm, La Coterie, St. Peter's, Guernsey; s May Boy of Mont Plaisant (3862 P.S., R.G.A.S.), d Lily of L'Aumone (14527 P.S.), s d Honoria's Sequel 2nd (2816 P.S.). (Last calf, January 21, 1923).

III. (£2.)—MRS. R. C. BAINBRIDGE, Elfordleigh, Plympton, Devon, fawn an white, **Tregonning Lucky,** born 30th August, 1918, bred by G. Blight, Tregonning, Cornwall; s Tregonning Masher 4th (3423), d Imp Gipsy Girl 2nd (8951), s d Captain Ite (1815 P.S.) (Last calf, January 23, 1923).

SHEEP.

SHROPSHIRE.

(The First Prize in Class 136 was offered by the Shropshire Sheep Breeders' Association).

CLASS 136.—*Shropshire Two Shear Ram—First prize,* £10—*second,* £5—*third,* £2.

[NO ENTRY.]

CLASS 137.—*Shropshire Shearling Ram.* [1 entry.]

I. (£10.)—N. J. NUNNERLEY, Tern Hill, Market Drayton, Salop.

CLASS 138.—*Pair of Shropshire Ram Lambs, dropped in* 1923. [1 entry.]

I. (£10.)—N. J. NUNNERLEY, Tern Hill, Market Drayton, Salop.

CLASS 139.—*Pen of three Shropshire Shearling Ewes.* [1 entry.]

I. (£10.)—N. J. NUNNERLEY, Tern Hill, Market Drayton, Salop.

DEVON LONGWOOLLED.

CLASS 140.—*Devon Longwoolled Shearling Ram.* [2 entries.]

I. (£10.)—F. WHITE, Torweston, Williton, Somerset.

II. (£5.)—F. WHITE.

CLASS 141.—*Pen of Three Devon Longwooled Shearling Ewes.* [2 entries.]

I. (£10.)—F. WHITE, Torweston, Williton, Somerset.

II. (£5.)—F. WHITE.

SOUTH DEVON.

CLASS 142.—*South Devon Shearling Ram—First prize,* £10, *second*—£5—*third,* £2.

[NO ENTRY.]

CLASS 143.—*Pen of three South Devon Shearling Ewes—First prize,* £10—*second,* £5—*third,* £2.

[NO ENTRY.]

KENT OR ROMNEY MARSH.

(The Prizes in Class 144 were given by the Kent or Romney Marsh Sheep Breeders' Association).

CLASS 144.—*Kent or Romney Marsh Two-Shear Ram.* [4 entries.]

I. (£10.)—J. E. QUESTED, The Firs, Cheriton, Kent.

II. (£5.)—J. E. QUESTED.

III. (£2.)—L. H. AND G. W. FINN, Westwood Court, Faversham.

R. & H.C.—THE EARL OF GUILFORD, Waldershare Park, Dover.

CLASS 145.—*Kent or Romney Marsh Shearling Ram.* [7 entries.]

I. (£10.)—J. E. QUESTED, The Firs, Cheriton, Kent.
II. (£5.)—J. E. QUESTED.
III. (£2.)—L. H. AND G. W. FINN, Westwood Court, Faversham.
R.—THE EARL OF GUILFORD, Waldershare Park, Dover.
H.C.—THE EARL OF GUILFORD.
C.—L. H. AND G. W. FINN.

CLASS 146.—*Pair of Kent or Romney Marsh Ram Lambs, dropped in* 1923. [5 *entries.*]

I. (£10.)—J. E. QUESTED, The Firs, Cheriton, Kent.
II. (£5.)—J. E. QUESTED.
III. (£2.)—THE EARL OF GUILFORD, Waldershare Park, Dover.
R.—L. H. AND G. W. FINN, Westwood Court, Faversham.

CLASS 147.—*Pen of three Kent or Romney Marsh Shearling Ewes.* [6 entries.]

I. (£10.)—J. E. QUESTED, The Firs, Cheriton, Kent.
II. (£5.)—J. E. QUESTED.
III. (£2.)—THE EARL OF GUILFORD, Waldershare Park, Dover.
R.—THE EARL OF GUILFORD.
H.C.—L. H. AND G. W. FINN, Westwood Court, Faversham.
C.—L. H. AND G. W. FINN.

SOUTHDOWN.

(The Prizes in Class 148 were given by the Southdown Sheep Society).

CLASS 148.—*Two Shear Southdown Ram.* [2 entries.]

I. (£10.)—LADY FITZGERALD, Buckland, Faringdon, Berks.
II. (£5.)—SIR J. COLMAN, BART., Gatton Park, Surrey.

CLASS 149.—*Southdown Shearling Ram.* [3 entries.]

I. (£10.)—SIR J. COLMAN, Bart., Gatton Park, Surrey.
II. (£5.)—SIR J. COLMAN, BART.
III. (£2.)—LADY FITZGERALD. Buckland, Faringdon, Berks.

CLASS 150.—*Pen of three Southdown Shearling Ewes.* [3 entries.]

I. (£10.)—SIR J. COLMAN, BART., Gatton Park, Surrey.
II. (£5.)—LADY FITZGERALD, Buckland, Faringdon, Berks.
III. (£2.)—SIR J. COLMAN, BART.

SPECIAL PRIZE.

GIVEN BY THE SOUTHDOWN SHEEP SOCIETY, UNDER CONDITION 65, SUBJECT TO THERE BEING AT LEAST THREE COMPETITORS.

Silver Medal, or £1, *for the best Ram in Classes* 148 *and* 149.

I.—SIR J. COLMAN, BART., Gatton Park, Surrey.

R.—LADY FITZGERALD, Buckland, Faringdon, Berks.

HAMPSHIRE DOWN.

(The Prizes in Class 152 and the Champion Prize were given by the Hampshire Down Sheep Breeders' Association).

CLASS 151.—*Hampshire Down Shearling Ram.* [6 entries.]

I. (£10.)—V. T. THOMPSON, Norton Manor, Sutton Scotney.

II. (£5.)—MRS. JERVOISE, Herriard Park, Basingstoke.

III. (£2.)—TRUSTEES OF THE LORD WANDSWORTH AGRICULTURAL COLLEGE, Long Sutton, Basingstoke.

R.—V. T. THOMPSON.

H.C.—J. WHITE, Foxhill Estate, Swindon, Wilts.

C.—MRS. JERVOISE.

CLASS 152.—*Hampshire Down Ram Lamb, dropped in* 1923. [7 entries.]

I. (£7.)—MRS. JERVOISE, Herriard Park, Basingstoke.

II. (£5.)—Major J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks.

III. (£2.)—TRUSTEES OF THE LORD WANDSWORTH AGRICULTURAL COLLEGE, Long Sutton, Basingstoke.

R.—V. T. THOMPSON, Norton Manor, Sutton Scotney.

V.H.C.—MRS. JERVOISE.

H.C.—V. T. THOMPSON.

C.—J. WHITE, Foxhill Estate, Swindon, Wilts.

CLASS 153.—*Pair of Hampshire Down Ram Lambs, dropped in* 1923. [5 entries.]

I. (£10.)—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks.

II. (£5.)—V. T. THOMPSON, Norton Manor, Sutton Scotney.

III. (£3.)—MRS. JERVOISE, Herriard Park, Basingstoke.

R.—TRUSTEES OF THE LORD WANDSWORTH AGRICULTURAL COLLEGE, Long Sutton, Basingstoke, Hants.

H.C.—J. WHITE, Foxhill Estate, Swindon, Wilts.

CLASS 154.—*Pen of three Hampshire Down Shearling Ewes.* [6 entries.]

I. (£10.)—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks.

II. (£5.)—V. T. THOMPSON, Norton Manor, Sutton Scotney.

III. (£2.)—V. T. THOMPSON.

R.—J. WHITE, Foxhill Estate, Swindon, Wilts.

C.—W. M. WILLS, Estate Office, Bracken Hill, Leigh Woods, near Bristol.

CHAMPION PRIZE.

Best Pen of Hampshire Down Lambs in Classes 152 *and* 153 (*Single Ram Lamb to constitute a Pen*).

I. (£5.)—MRS. JERVOISE, Herriard Park, Basingstoke.

R.—MAJOR J. A. MORRISON, D.S.O., Basildon Park, Goring, Reading, Berks.

OXFORD DOWN.

CLASS 155.—*Oxford Down Shearling Ram.* [8 entries.]

I. (£10.)—H. W. STILGOE, The Grounds, Adderbury, near Banbury, Oxon.

II. (£5.)—W. TREVETHAN, Broadstone Hill, Chipping Norton, Oxon.

III. (£2.)—F. PENSON, Taston, Charlbury, Oxon.

R.—H. W. STILGOE.

H.C.—C. T. SCOTT, Buckland Manor, Broadway, Worcestershire, bred by R. W. Hobbs & Sons, Kelmscott, Lechlade.—H. W. STILGOE.

CLASS 156.—*Pair of Oxford Down Ram Lambs, dropped in* 1923. [5 entries.]

I. (£10.)—F. PENSON, Taston, Charlbury, Oxon.

II. (£5.)—MAJOR R. F. FULLER, Great Chalfield, Melksham.

III. (£2.)—CAPTAIN E. G. SPENCER CHURCHILL, M.C., Northwick Park, Blockley, Worcs.

R.—W. TREVETHAN, Broadstone Hill, Chipping Norton, Oxon.

H.C.—H. W. STILGOE, The Grounds, Adderbury, near Banbury, Oxon.

CLASS 157.—*Pen of three Oxford Down Shearling Ewes.* [4 entries.]

I. (£10.)—F. PENSON, Taston, Charlbury, Oxon.

II. (£5.)—CAPT. E. G. SPENCER CHURCHILL, M.C., Northwick Park, Blockley, Worcs.; bred by J. Johnston, Cote House, Bampton, Oxon.

III. (£2.)—H. W. STILGOE, The Grounds, Adderbury, near Banbury, Oxon.

R.—W. TREVETHAN, Broadstone Hill, Chipping Norton, Oxon.

(The Prizes in Class 158 were given by the Oxford Down Sheep Breeders' Association, and were withheld until the Animals awarded the Prizes were registered in the Flock Book).

CLASS 158.—*Pair of Oxford Down Ewe Lambs, dropped in* 1923. [5 entries.]

I. (**£6.**)—F. PENSON, Taston, Charlbury, Oxon.

II. (**£3.**)—CAPT. E. G. SPENCER CHURCHILL, M.C., Northwick Park, Blockley, Worcs.

III. (**£1.**)—W. TREVETHAN, Broadstone Hill, Chipping Norton, Oxon.

R.—MAJOR R. F. FULLER, Great Chalfield, Melksham.

H.C.—H. W. STILGOE, The Grounds, Adderbury, near Banbury, Oxon.

DORSET HORN.

(The animals entered in Classes 159 and 161 must have been shorn bare in the year of the Show).

CLASS 159.—*Dorset Horn Shearling Ram.* [2 entries.]

I. (**£10.**)—F. J. MERSON & SON, Farringdon, North Petherton, Bridgwater.

II. (**£5.**)—F. J. MERSON & SON.

CLASS 160.—*Pair of Dorset Horn Ram Lambs, dropped after November 1st*, 1923. [2 entries.]

I. (**£10.**)—F. J. MERSON & SON, Farringdon, North Petherton, Bridgwater.

CLASS 161.—*Pen of three Dorset Horn Shearling Ewes.* [3 entries.]

I. (**£10.**)—C. MORRIS, Highfield Hall, St. Albans, and Bishops Lydeard, Somerset.

II. (**£5.**)—F. J. MERSON & SON, Farringdon, North Petherton, near Bridgwater.

III. (**£2.**)—F. J. MERSON & SON.

(The Prizes in Class 162 were given by the Dorset Horn Sheep Breeders' Association, and in Class 163 by C. Morris, Esq., and the Association).

CLASS 162.—*Pen of three Dorset Horn Ewe Lambs, dropped after November 1st*, 1922. [2 entries.]

I. (**£10.**)—F. J. MERSON & SON, Farringdon, North Petherton, Bridgwater.

II. (**£5.**)—C. MORRIS, Highfield Hall, St. Albans, and Bishops Lydeard, Somerset.

CLASS 163.—***Pen of three Dorset Horn Ewe Lambs, dropped after November 1st*, 1922, *the property of a member of the Dorset Horn Sheep Breeders' Association, who had not won a prize at the Royal, Bath and West, or Royal Counties Show during the last four years —First prize*, £12—*second*, £6—*third*, £3.**

NO ENTRY.

EXMOOR HORN.

(The Prizes in Class 164 were given by the Exmoor Horn Sheep Breeders' Society).

CLASS 164.—*Exmoor Horn Ram, two-shear and upwards.* [2 entries.]

I. (£10.)—J. HARRIS, Wistland Pound, Kentisbury, Barnstaple, Devon.

II. (£5.)—F. C. GILL, Wistland, Kentisbury, near Barnstaple, North Devon, bred by J. Harris, Wistland. Pound, Kentisbury.

CLASS 165.—*Exmoor Horn Shearling Ram.* [2 entries.]

I. (£10.)—J. HARRIS, Wistland Pound, Kentisbury, Barnstaple, Devon.

II. (£5.)—F. C. GILL, Wistland, Kentisbury, near Barnstaple, North Devon.

CLASS 166.—*Pen of three Exmoor Horn Shearling Ewes.* [2 entries.]

I. (£10.)—J. HARRIS, Wistland Pound, Kentisbury, Barnstaple, Devon.

II. (£5.)—F. C. GILL, Wistland, Kentisbury, near Barnstaple.

SUFFOLK.

(£25 towards the Prizes in Classes 167 to 170 were given by the Suffolk Sheep Society).

CLASS 167.—*Suffolk Ram, two-shear and upwards—First prize,* £10—*second,* £5—*third,* £2.

[NO ENTRY.]

CLASS 168.—*Suffolk Shearling Ram.* [5 entries.]

I. (£10.)—W. G. BUCHANAN, Manor House Farm, Abergavenny, bred by Sir F. H. Bathurst, Bart., Somborne Park, Stockbridge, Hants.

II. (£5.)—A. PRESTON JONES, Mickleover House, near Derby, bred by — Sherwood, Playford, Ipswich.

III. (£2.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester.

R.—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, bred by F. Bonnor Barling & Son, Amberley, Newmarket.

CLASS 169.—*Pair of Suffolk Ram Lambs, dropped in* 1923. [6 entries.]

I. (£10.)—A. PRESTON JONES, Mickleover House, near Derby.

II. (£5.)—W. G. BUCHANAN, Manor House Farm, Abergavenny.

III. (£2.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester.

R.—W. R. BOARD, Great Frampton, Llantwit Major, Cardiff.

CLASS 170.—*Pen of three Suffolk Ewe Lambs, dropped in* 1923. [5 entries.]

I. (£10.)—A. PRESTON JONES, Mickleover House, near Derby.

II. (£5.)—W. G. BUCHANAN, Manor House Farm, Abergavenny.

III. (£2.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester.

R.—W. R. BOARD, Great Frampton, Llantwit Major, Cardiff.

RYELAND.

(£15 of the Prizes in Classes 171 to 174 were given by the Ryeland Sheep Society)

CLASS 171.—*Ryeland Ram, two-shear and upwards.* [8 entries.]

I. (£10.)—T. L. MARTIN, Ashe Warren House, near Overton, Hants, bred by C. C. Jacobs, Manor Farm, Tidmarsh, Reading.

II. (£5.)—MRS. H. HUDDLESTON, Clytha Park, Abergavenny.

III. (£2.)—E. JONES, Penybont Farm, Sennybridge.

R.—E. JONES.

CLASS 172.—*Ryeland Shearling Ram.* [9 entries.]

I. (£10.)—T. L. MARTIN, Ashe Warren House, near Overton, Hants, bred by J. Q. Rowett, Ely Place, Frant, Sussex.

II. (£5.)—T. L. MARTIN.

III. (£2.)—E. W. LANGFORD, LTD., Hereford.

R.—E. W. LANGFORD, LTD.

CLASS 173.—*Pair of Ryeland Ram Lambs, dropped in* 1923. [3 entries.]

I. (£10.)—E. W. LANGFORD, LTD., Hereford.

II. (£5.)—T. L. MARTIN, Ashe Warren House, near Overton, Hants.

III. (£2.)—F. W. MORRIS, Brynderwen Farm, Llangasty Talyllyn, near Brecon.

CLASS 174.—*Pen of three Ryeland Shearling Ewes.* [6 entries.]

I. (£10.)—T. L. MARTIN, Ashe Warren House, Overton, Hants.

II. (£5.)—E. W. LANGFORD, LTD., Hereford.

III. (£2.)—J. R. N. WATERS, Fawke Farm, Sevenoaks, Kent.

R.—F. T. GOUGH, Lugwardine, Hereford.

WELSH MOUNTAIN.

CLASS 175.—*Welsh Mountain Ram, two-shear and upwards.* [6 entries.]

I. (£10.)—D. L. PRICE, Brynygrinun, Ystradgynlais, Brecknockshire.

II. (£5.)—O. PRICE, Nantyrharn, Cray, Breconshire, bred by J. L. Gratton, Brynewnin, Rhuddlau.

III. (£2.)—W. S. PRICE, Nantymadog, Cray, Brecon, bred by Major E. J. W. Platt, Madryn, Aber.

R.—T. MORRIS, Castell Farm, Trapp, Llandilo, bred by D. W. Morris, Penywern, Talybont, Cards.

V.H.C.—T. WILLIAMS, Tirgof Farm, Lower Cwmtwrch, Brecon.

H.C.—T. W. DAVIES, The Cefn, Pontypridd, bred by O. Price, Nantyrharn, Cray.

Class 176.—*Welsh Mountain Shearling Ram.* [3 entries.]

I. (£10.)—O. Price, Nantyrharn, Cray, Breconshire.

II. (£5.)—O. Price.

III. (£2.)—W. S. Price, Nantymadog, Cray, Brecon.

Class 177.—*Pen of three Welsh Mountain Shearling Ewes.* [2 entries.]

I. (£10.)—O. Price, Nantyrharn, Cray, Brecon.

II.(£5.)—W. S. Price, Nantymadog, Cray, Brecon.

Class 178.—*Pen of three Welsh Mountain Ewe Lambs, dropped in* 1923.

I. (£10.)—O. Price, Nantyrharn, Cray, Brecon.

II. (£5.)—W. S. Price, Nantymadog, Cray, Brecon.

KERRY HILL.

(£15 15s. towards the Prizes in Classes 179 to 181 were given by the Kerry Hill (Wales) Flock Book Society, and animals must have been shown uncoloured; the names and Flock Book Numbers of Rams to be given and in Class 181 the Ewes to be bred from one Flock and the Breeders' name given).

Class 179.—*Kerry Hill Ram, two-shear and upwards.* [3 entries.]

I. (£10.)—Dinam Estates Company, Llandinam, Co. Montgomery, **Mellington Ultra,** bred by C. S. Williams, Mellington Farm, Churchstoke, Montgomery.

II. (£5.)—The Earl of Lisburne, Crosswood, Cardiganshire, bred by Major D. Davies, M.P., Bronerion, Llandinam, Mont.

III. (£2.)—Sir D. R. Llewellyn, Bart., The Court, St. Fagans, near Cardiff, **Pentreant Quaker** (77934), bred by W. V. Davies, Pentreant.

Class 180.—*Kerry Hill Shearling Ram.* [3 entries.]

I. (£10.)—Dinam Estates Company, Llandinam, Co. Montgomery, **Gwernygoe Chatterbox,** bred by D. Davies, M.P., Broneirion, Llandinam, Co. Montgomery.

II. (£5.)—Dinam Estates Company, **Gwernygoe Challenger,** ditto.

Class 181.—*Pen of three Kerry Hill Shearling Ewes.* [6 entries.]

I. (£10.)—Dinam Estates Company, Llandinam, Co. Montgonery, bred by D. Davies, M.P., Broneirion, Llandinam, Co. Mont.

II. (£5.)—The Earl of Lisburne, Crosswood, Cardiganshire.

III. (£2.)—The Earl of Lisburn.

R.—The Hon. Mrs. Smyth, Ashton Court, Bristol.

CHAMPION PRIZE.

Given by H.R.H. The Prince of Wales, K.G.

A Challenge Cup, value £20, *for the best Animal exhibited in Class* 180 *or* 181, *to be won three times in succession or four times altogether before becoming the property of the Exhibitor.*

I.—Dinam Estates Company, Llandinam, Co., Montgomery, bred by D. Davies, M.P., Broneirion, Co. Mont.

BLACK WELSH MOUNTAIN.

(£10 towards the Prizes in Classes 182 and 183 were given by the Black Welsh Mountain Sheep Breeders' Association).

CLASS 182.—*Black Welsh Mountain Shearling Ram.* [4 entries.]

I. (£10.)—MRS. JERVOISE, Herriard Park, Basingstoke, bred by Lord Treowen, Llanover, Abergavenny.

II. (£5.)—A. E. W. DARBY, Adcote, Shrewsbury.

III. (£2.)—A. E. W. DARBY.

R.—MAJOR-GENERAL LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny, bred by Lord Harlech.

CLASS 183.—*Pen of three Black Welsh Mountain Shearling Ewes.* [4 entries.]

I. (£10.)—MAJOR-GENERAL LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny.

II. (£5.)—A. E. W. DARBY, Adcote, Shrewsbury.

III. (£2.)—MRS. JERVOISE, Herriard Park, Basingstoke.

R.—A. E. W. DARBY.

GOATS.

(£9 10s. 0d. towards the Prizes in Classes 184 to 187 were given through the British Goat Society).

CLASS 184.—*Female Goat. Any variety, that has kidded.* [4 entries.]

I. (£2 10s.)—MISS E. SKIDMORE, Ashley Leigh, Box, Wilts, fawn and white Anglo-Nubian-Swiss, **Heddon Speedwell** (H.B. 4147), born 10th March, 1920 ; s Brendon Friday (T. 349), d Wigmore Clover **Q* (H.B. 2197), s d †Topaz.

II. (£1 10s.)—MISS E. SKIDMORE, brown and white, Anglo-Swiss, **Heddon Amie** (H.B. 4409), born 29th March, 1920, bred by J. Morley, Ashley, Box ; s Tremanton of Trenance (H.B. 3286), d Cerese (P.R. 2935), s d †Grange Granite (2369).

III. (15s.)—J. F. R. DANIEL, New House, Monmouth, drab (white markings) Anglo-Nubian-Swiss, **Zoyland Bettie** (H.B. 2874), born 3rd May, 1917, bred by Miss A. B. Cullen, Elmcroft, Horley, Surrey ; s Withdean Ajax (2314), d, Keighley Biddie (2531), s d Druidstone Rupert (1977).

R.—J. F. R. DANIEL, brown (white markings) Anglo-Nubian-Swiss, **Emmanuel Faerie** (4038), born 22nd January, 1920, bred by W. C. Heaton, Westwood, Hewelsfield, St. Briavels, Glos. ; s Keighley Warrior (3359), d Zoyland Bettie (2874), s d Withdean Ajax (2314).

CLASS 185.—*Goatling. Any variety, over 1 year, but not exceeding two years.* [6 entries.]

I. (£2 10s.)—MISS E. SKIDMORE, Ashley Leigh, Box, Wilts, biscuit, Anglo-Nubian-Swiss, **Heddon Snowdrop** (H.B. 5260), born 20th February, 1922 ; s †Peter of Bashlet (H.B. 4207), d Heddon Speedwell (H.B. 4247), s d †Edenstead Pluck (3007).

II. (£1 10s.)—MISS E. SKIDMORE, white, Anglo-Nubian-Swiss, **Heddon Spring** (5263), born 23rd March, 1922; s †Peter of Bashley (4207), d Heddon Amie (4409), s d †Edenstead Pluck (3007).

III. (15s.)—MISS E. SKIDMORE, biscuit, Anglo-Nubian-Swiss, **Heddon Saffron** (5263), born 20th February, 1922; s †Peter of Bashley (4207), d Heddon Speedwell (4147), s d †Edenstead Pluck (3007).

R. & V.H.C.—R. M. THOMAS, Glasfryn, Forestfach, Swansea, light fawn, Anglo-Nubian-Swiss, **Paddy the Next Best Thing,** born 5th March, 1922; s †Professor of Bashley (H.B. 3940), d Senora of Cardonald (H.B. 4349), s d Killerton Pink Pearl (H.B. A.N. 988).

V.H.C.—J. F. R. DANIEL, New House, Monmouth, black (white markings), Anglo-Nubian-Swiss (variety, British Alpine), **Kymin Patricia** (H.B. 5440), born 20th March, 1922; s †Keighley Noble, d Binfield Buttercup s d Bilfield Pasha.

H.C.—J. F. R. DANIEL, brown (white markings), Anglo-Nubian-Swiss, **Annie Mary** (K.R. 9863), born 13th March, 1922; s †Ridgeway Rollo, d Daffy.

CLASS 186.—*Female Kid. Any variety.* [3 entries.]

I. (£2 10s.)—J. F. R. DANIEL, New House, Monmouth, brown (chocolate, white markings), Anglo-Nubian-Swiss, **Kymin Binkie** (K.R. 10085), born 10th December, 1922; s Keighley Noble, d Zoyland Bettie, s d Withdean Ajax.

II. (£1 10s.)—MISS E. SKIDMORE, Ashley Leigh, Box, Wilts, brown and white, Anglo-Nubian-Swiss, **Heddon Sorrel** (5801), born 5th March, 1923; s †Peter of Bashley (4207), d Heddon Speedwell (4147), s d †Edenstead Pluck (3007).

III. (15s.)—MISS E. SKIDMORE, white, Anglo-Nubian-Swiss, **Heddon Syringa** (5802), born 5th March, 1923; s †Peter of Bashley (4207), d Heddon Speedwell (4147), s d †Edenstead Pluck (3007).

CLASS 187.—*Male Goat. Any variety, over one year.* [3 entries.]

I. (£2 10s.)—MISS E. SKIDMORE, Ashley Leigh, Box, Wilts, white, Saanen-Swiss, **Schnapps** (H.B. S. 34), imported 1922).

II. (£1 10s.)—MISS E. SKIDMORE, white, Anglo-Nubian-Swiss, **†Peter of Bashley** (H.B.) 4207), born 19th March, 1920, bred by Miss Pope, Bashley Lodge, New Milton, Hants; s †Edenstead Pluck (H.B. 3007), d Promise of Bashley Q*Q*Q* (H.B. 3075), s d †Proud (H.B. 3853) (Ch.)

III. (15s.)—J. F. R. DANIEL, New House, Monmouth, brown (white markings), Anglo-Nubian-Swiss, **†Professor of Bashley** (3940), born 6th May, 1919, bred by Miss Pope, Bashley Lodge, New Milton, Hants; s †Edenstead Pluck (3007), d Problem of Bashley Q*Q*Q* (3076), s d Ch. †Proud (2853).

PIGS.

BERKSHIRE.

(£9 towards the Prizes in Classes 188 to 191 were given by the British Berkshire Society).

CLASS 188.—*Berkshire Boar exceeding 18 months old.* [1 entry.]

I. (£7.)—J. NAGLE, Stonehenge Pedigree Stock Farm, Amesbury, Wilts, **Pamber President** (22702), born 10th April, 1920; s Minley King (18364), d Compton Guest (20188), s d Manor Baronet (18978).

CLASS 189.—*Berkshire Boar, not exceeding* 18 *months old.* [3 entries.]

I. (**£5.**)—J. NAGLE, Stonehenge Pedigree Stock Farm, Amesbury, Wilts, born 25th March, 1922; s Pamber President (22702), d Pamber Hebe (23404), s d Minley King (18364).

II. (**£3.**)—J. NAGLE, born 13th August, 1922; s Pamber President (22702), d Pamber Plunkette (22700), s d Minley King (18364).

CHALLENGE CUP (*Value* £10 10*s*.).

GIVEN BY THE BRITISH BERKSHIRE PIG SOCIETY.

To be won twice in succession or three times in all before becoming the property of the Exhibitor.

Best Boar in Classes 188 *or* 189.

I.—J. NAGLE, Stonehenge Pedigree Stock Farm, Amesbury, Wilts, **Pamber President** (22702), born 10th April, 1920; s Minley King (18364), d Compton Guest (20188), s d Manor Baronet (18978).

R.—J. NAGLE, born 25th March, 1922; s Pamber President (22702), d Pamber Hebe (23404), s d Minley King (18364).

CLASS 190.—*Berkshire Breeding Sow, exceeding* 18 *months old.* [4 entries.]

I. (**£7.**)—H. C. SUTTON, Benham Park, Newbury, Berks, **Highclere Gay Lass** (24145), born 5th June, 1920, bred by the Earl of Carnarvon, Highclere Warrior (22611), d Manor Bella (21425), s d Braishfield Buck (19909).

II. (**£3.**)—S. F. EDGE'S PIG FARMS, LTD., Gallop's Estate Office, Ditchling, Sussex, **Peel Grace** (24265), born 25th January, 1920, bred by L. Harrison and Co., Ltd., Pedigree Live Stock Farms, Coolham, Horsham; s Revenge (22315), d Reading Berkshire Champion (22312), s d Robert 2nd (20227).

CLASS 191.—*Berkshire Breeding Sow, not exceeding* 18 *months old.* [6 entries.]

I. (**£5.**)—H. C. SUTTON, Benham Park, Newbury, Berks, **Sotwell Muriel** (S. 161), born 6th January, 1922, bred by the late Lord Ebury; s Herriard Premier (21853), d Iwerne Megan 3rd (21739), s d Hurry On (19635).

II. (**£3.**)—J. NAGLE, Stonehenge Pedigree Stock Farm, Amesbury, Wilts, **Theale Ruby** (S. 1021), born 11th March, 1922, bred by W. J. Cumber, Theale, Berks; s Carry On (21191), d Forest Ruby (25415), s d Whitley O.K. (20499).

III. (**£2.**)—S. F. EDGE'S PIG FARMS, LTD., Gallop's Estate Office, Ditchling, Sussex, **Miss Dainty 2nd**, born 20th March, 1922, bred by J. Fricker, Marsh Farm, Stalbridge; s Heale War Lunn (24172), d Princess Royal 5th (19695), s d Motcombe Cognac (16605).

R.—J. NAGLE, born 5th January, 1922; s Pamber President (22702), d Pamber Prevoyant (22701), s d Minley King (18364).

CHALLENGE CUP (*Value* £10 10*s.*)
GIVEN BY THE BRITISH BERKSHIRE SOCIETY.

To be won twice in succession or three times in all before becoming the property of the Exhibitor.

Best Sow in Classes 190 *or* 191.

I.—H. C. SUTTON, Benham Park, Newbury, Berks, **Sotwell Muriel** (S. 161), born 6th January, 1922, bred by the late Lord Ebury; s Herriard Premier (21853), d Iwerne Megan 3rd (21739), s d Hurry On (19635).

R.—J. NAGLE, Stonehenge Pedigree Stock Farm, Amesbury, Wilts, **Theale Ruby** (S. 1021), born 11th March, 1922, bred by W. J. Cumber, Theale, Berks; s Carry On (21191), d Forest Ruby (25415), s d Whitley O.K. (20499).

LARGE BLACK.

(£40 towards the prizes in the Large Black Classes and the Champion Prizes were given by the Large Black Pig Society).

CLASS 192.—*Large Black Boar, farrowed before May*, 1, 1922. [12 entries.

I. (£7.)—J. WARNE, Tregonhayne, Grampound Road, Cornwall, **Valley Result** (18535), born 5th September, 1920, bred by J. C. Olver, Woodland Valley, Grampound Road; s Fentongollan Result (9585), d Beauty of the Valley 40th (28964), s d Valley Togo (4675).

II. (£5.)—A. P. COCKBURN, Stanborough, Holwell, South Devon, **Awton Sampson** (21891), born 7th March, 1921, bred by G. H. Beaton, Sheplegh Court, Blackawton, South Devon; s Cornwood Confessor (12967), d Drayton Daphne (33556), s d Loughtor Marvel (4437).

III. (£2.)—E. W. EDWARDS, Pevnor House, Chesham, Bucks, **Pevnor Chief 1st** (22743), born 18th January, 1922; s Oadby Chief (16587), d Awton Mischief (49790), s d Sudbourne Awton Chief (10571).

R.—A. D. LAURIE, Homefield, Sevenoaks, Kent, **Cornwood Marvel 4th**, bred by J. H. Glover, Cornwood, South Devon; s Cornwood Marvel (15831), d Cornwood Lass 58th (38332).

V.H.C.—S. NUTHALL, Runtley Farm, Sutton Green, near Guildford, **Runtley Ruler**, born 29th March, 1922; s Cornwood Marvel 2nd (15831), d Witham Victory 2nd (55640), s d Whiteford Ranget (11521).

H.C.—F. W. A. DANIELS, Higher Ford, Wellington, **Wellington Watchman** (18836), born 3rd January, 1921; s Bassingbourne Squire (9035), d Kibbear Lady Ford (44360), s d Drayton Disappointment 2nd (4573).

C.—S. F. EDGE'S PIG FARMS, LTD., Gallop's Estate Office, Ditchling, Sussex, **Coolham Blacky** (20775), born 7th January, 1921, bred by L. Harrison & Co., Ltd., Pedigree Live Stock Farms, Coolham, Horsham; s Coolham Marvel (16635), d Docking Oleander 2nd (27110), s d Cleave Perfection (5801).

CLASS 193.—*Large Black Boar, not exceeding* 12 *months old on May* 1*st*, 1923. [9 entries.]

I. (£7.)—A. D. LAURIE, Homefield, Sevenoaks, Kent. **Maxwelltoun Black Prince** (43), born 5th July, 1922; s Tinten Lad (18687), d Maxwelltoun Souvenir 29th (63064), s d Tinten King John 2nd (12489).

II. (£5.)—C. C. PYKE, O.B.E., Capel Leyse, Holmwood, Surrey, **Holmwood Laddie** (25599), born 6th June, 1922; s Drayton Convivial 3rd (16457), d Treveglos Lass 22A (44736), s d Vahan Melva 2nd (5691).

III. (£2.)—H. J. WATSON, Hermonger's, Rudgwick, Sussex, **Hermonger's Harry 3rd** (25111), born 30th July, 1922; s Drayton's Champion Lad 1st (16447), d Haven Hettie (31832), s d Hasketon Miller (8143).

R.—W. J. WARREN, Deacon's Farm, Staplegrove, Taunton, **Kibbear Royal Topper,** born 12th July, 1922; s Cottishall Dandelion (10487), d Kibbear Royal Lady 10th (76936), s d Brent Councillor (17953).

CLASS 194.—*Large Black Boar, farrowed in* 1923. [12 entries.]

I. (£7.)—W. J. WARREN, Deacon's Farm, Staplegrove, Taunton, **Kibbear Royalist,** born 2nd January; s Vahan Jack 5th (13845), d Trull Dusky Queen 2nd (52840), s d Bassingbourne Squire (9053).

II. (£3.)—H. E. BASTARD, Tinten Manor, St. Tudy, Cornwall, **Tinten Jock,** born 3rd January; s Railton Hero (13241), d Tinten Dadodil 3rd (83794), s d Westpetherwin Chief 1st (14433).

III. (£2.)—E. W. EDWARDS, Pevnor House, Chesham, Bucks, **Pevnor Anchorite 6th** (25913), born 19th January; s Ashwell Anchorite 3rd (14417), d Awton Quiet (71948), s d Cornwood King John (8271).

R.—C. C. PYKE, O.B.E., Capel Leyse, Holmwood, Surrey, **Holmwood Radiator** (25747), born 22nd January; s Holmwood Koh-i-noor (20967), d Greystones Sonora 17th (67028), s d Greystones Chum (10793).

V.H.C.—C. C. PYKE, O.B.E., **Holmwood Gem** (25741), born 12th January; s Holmwood Koh-i-noor (20967), d Holmwood Cineraria 2nd (74368), s d Wiveton Colonel (12497).

H.C.—A. D. LAURIE, Homefield, Sevenoaks, Kent, **Maxwelltoun Laddie 6th,** born 10th January; s Cornwood Marvel 3rd (21633), d Maxwelltoun Lassie 20th (45558), s d Maxwelltoun Victor (8823).

C.—W. L. HOSKING & SONS, Fentongollan, Probus, Cornwall, **Fentongollan Palaver,** born 11th January; s McHeather Bob 18th (16421), d Fentongollan Juanita 2nd (19250), s d Cleave Fentongollan That's Him (5613).

CHAMPION PRIZE.

Best Animal in Classes 192 *to* 194.

I. (£5.)—J. WARNE, Tregonhayne, Grampound Road, Cornwall, **Valley Result** (18535), born 5th September, 1920, bred by J. C. Olver, Woodland Valley, Grampound Road; s Fentongollan Result (9585), d Beauty of the Valley 40th (28964), s d Valley Togo (4675).

R.—W. J. WARREN, Deacon's Farm, Staplegrove, Taunton, **Kibbear Royalist,** born 2nd January; s Vahan Jack 5th (13845), d Trull Dusky Queen 2nd (52840), s d Bassingbourne Squire (9053).

CLASS 195.—*Large Black Breeding Sow, farrowed before May* 1, 1922. [11 entries.]

I. (£7.)—J. WARNE, Tregonhayne, Grampound Road, Cornwall, **Treveglos Lass 30th** (44732), born 16th February, 1920; s Vahan Melva 2nd (5691), d Treveglos Lass 19th (23370), s d Valley None Such (5401).

II. (**£5.**)—E. W. Edwards, Pevnor House, Chesham, Bucks, **Docking Salt** (76490), born 7th June, 1920, bred by H. Groom, Docking, Norfolk; s Valley Fashionable (10271), d Testerton Cruet (30638), s d Sudbourne Chance It (7985).

III. (**£2.**)—W. Wills, Marlwood, Thornbury, Glos., **Lustleigh Marchioness 30th** (25420), born 14th March, 1918; s Swardeston Prince of Lustleigh (7787), d Lustleigh Marchioness 24th (13018), s d Drayton Dandy (3331).

R.—A. D. Laurie, Homefield, Sevenoaks, Kent, **Maxwelltoun Souvenir 31st** (73320), born 28th January, 1921; s Tinten King John 2nd (12489), d Maxwelltoun Souvenir 8th.

V.H.C.—Sir H. Hall, Gloverswood, Charlwood, Surrey, **Charlwood Sabine 12th** (91732), born 6th January, 1922; s Charlwood Neptune 1st (19039), d Wilbraham Sabine 1st (28002), s d Wilbraham Surrender (8359).

H.C.—W. L. Hosking & Sons, Fentongollan, Probus, Cornwall, **Fentongollan Smiling Lady 4th** (89140), born 17th February, 1922; s Fentongollan Orion (19347), d Fentongollan Smiling Lady (26374), s d Treveglos Leader 3rd (6015).

Class 196.—*Large Black Breeding Sow, not exceeding* 12 *months old on May* 1, 1923. [9 entries.]

I. (**£7.**)—W. Wills, Marlwood, Thornbury, Glos., **Lustleigh Merrythought** (92494), born 8th July, 1922; s Bywell Arrow (13857), d Vahan Merrythought (17588), s d Trevisquite Vahan (4845).

II. (**£5.**)—W. L. Hosking & Sons, Fentongollan, Probus, Cornwall, **Fentongollan Decoy** (96288), born 18th August, 1922; s Fentongollan Result 2nd (21881), d Trevisquite Victory 11th (30334), s d Restronguet Pioneer (6997).

III. (**£2.**)—C. C. Pyke, O.B.E., Capel Leyse, Holmwood, Surrey, **Holmwood Lass** (98118), born 4th June, 1922; s Drayton Convivial 3rd (16457), d Treveglos Lass 22A (44736), s d Vahan Melva 2nd (5691).

R.—A. D. Laurie, Homefield, Sevenoaks, Kent. **Maxwelltoun Souvenir 48th** (98764), born 9th May, 1922; s Maxwelltoun Prince Charlie, d Maxwelltoun Souvenir 8th.

V.H.C.—H. E. Bastard, Tinten Manor, St. Tudy, Cornwall, **Tinten Princess 5th** (89384), born 2nd May, 1922; s Westpetherwin Chief 1st (14433), d Tinten Black Bess 34th (38340), s d Cornwood King John (8271).

H.C.—H. S. Rowe, Windrush Manor, Burford, Oxon., **Windrush Saidie,** born 3rd May, 1922; s Stanton Tom (19957), d Dunley Maud 5th (48732), s d Hasketon Earl 14th (10333).

C.—Sir H. Hall, Gloverswood, Charlwood, Surrey, **Charlwood Biddy 8th** (98912), born 20th May, 1922; s Charlwood Earl 1st (18707), d Charlwood Biddy 2nd (64638), s d Bassingbourne Achilles 1st (14079).

Class 197.—*Pair of Large Black Breeding Sows, farrowed in* 1923. [13 *entries.*]

I. (**£7.**)—H. J. Kingwell, Bow Grange, Totnes, Devon, **Brent Sunflower 70th and 71st,** born 28th January; s Hewes General (14903), d Brent Sunflower 27th (42648), s d Heathcott Rectangle (4855).

II. (£3.)—H. E. Bastard, Tinten Manor, St. Tudy, Cornwall, **Tinten Primrose 1st** and **2nd** (99024 and 99026), born 7th January ; s Railton Hero (13241), d Tinten Black Bess 37th (48128), s d Trevisquite Padstonian (7973).

III. (£2.)—C. C. Pyke, O.B.E., Capel Leyse, Holmwood, Surrey, **Holmwood Senora 3rd** (99204), and **Holmwood Senora 4th** (99206), born 22nd January ; s Holmwood Koh-i-noor (20967), d Greystones Senora 17th (67028), s d Greystones Chum (10973).

R.—A. D. Laurie, Homefield, Sevenoaks, Kent, **Maxwelltoun Souvenir 50th** and **51st**, born 7th January ; s Cornwood Marvel 4th (21635), d Maxwelltoun Souvenir 34th (73326), s d Tinten King John 2nd (12489).

V.H.C.—Sir H. Hall, Gloverswood, Charlwood, Surrey, **Charlwood Biddy 13th** and **14th** (98922 and 98924), born 4th January ; s Charlwood Earl 1st (18707), d Charlwood Biddy 2nd (64638), s d Bassingbourne Achilles 1st (14079).

H.C.—E. W. Edwards, Pevnor House, Chesham, Bucks, **Pevnor Wonder 4th** and **5th** (99926 and 99928), born 8th January ; s Cornwood King John (8271), d Docking Wonder (76444), s d Vahan Level Wonder (9061).

C.—W. J. Warren, Deacon's Farm, Stapleford, Taunton, **Kibbear Lady Bella 1st** and **2nd**, born 2nd January ; s Vahan Jack 5th (13845), d Trull Dusky Queen 2nd (52840), s d Bassingbourne Squire (9053).

CHAMPION PRIZE.

Best Animal in Classes 195 *to* 197.

I. (£5.)—W. Wills, Marlwood, Thornbury, Glos., **Lustleigh Merrythought** (92394), born 8th July, 1922 ; s Bywell Arrow (13857), d Vahan Merrythought (17588), s d Trevisquite Vahan (4845).

R.—W. L. Hosking & Sons, Fentongollan, Probus, Cornwall, **Fentongollan Decoy** (96288), born 18th August, 1922 ; s Fentongollan Result 2nd (21881), d Trevisquite Victory 11th (30334), s d Restronguet Pioneer (6997).

LARGE WHITE.

(£10 towards the Prizes in Classes 198 to 201 and the Champion Prize were given by the National Pig Breeders' Association).

Class 198.—*Large White Boar, farrowed in* 1920, 1921, *or* 1922. [5 entries.]

I. (£7.)—T. H. Tilley, Manor Farm, Biddisham, Axbridge, **Kingmaker of Mendip** (33719), born 4th July, 1920, bred by A. W. White, Hillegom, Spalding ; s Kingmaker (24151), d Spalding Matchless 3rd (55132), s d Banner of Spalding (21987).

II. (£3.)—W. White & Sons, Pool Farm, Taunton, **Spalding Signal** (34103), born 3rd January, 1921, bred by A. W. White, Hillegom, Spalding ; s Kingmaker (24151), d Spalding Queen Mary 5th (61232), s d Banner of Spalding (21989).

III. (£2.)—The Earl of Ellesmere, Stetchworth Park, Newmarket, **Stetchworth Turk 16th** (30515), born 1st January, 1920 ; s Stetchworth Turk 7th (21351), d Worsley Lady 11th (39622), s d Worsley Emperor 38th (15479).

R.—S. F. Edge's Pig Farms, Ltd., Gallop's Estate Office, Ditchling, Sussex, **Shipley Bob** (34069), born 1st January, 1921, bred by L. Harrison & Co., Ltd., Pedigree Live Stock Farms, Coolham, Horsham; s Nonsuch of Tockwith 2nd (27069), d Bushes Pride 5th (65564), s d Wyboston Turk 31st (25049).

H.C.—F. W. Hickton, Belbroughton, near Stourbridge, **Brookfield Lion Heart** (29013), born 2nd January, 1920; s Lion Heart of Caldmore, d Jewel of Brookfield, s d Bonnie Bourne.

Class 199.—*Large White Boar, farrowed in* 1923. [4 entries.]

I. (£5.)—S. F. Edge's Pig Farms, Ltd., Gallop's Estate Office, Ditchling, Sussex, born 6th January; s Nonsuch of Tockwith 2nd (27069), d Bushes Pride 5th (65564), s d Wyboston Turk 31st (25049).

II. (£3.)—W. White & Sons, Pool Farm, Taunton, **Taunton Jay 6th,** born 7th January; s Caldmore Jay (Vol. 39), d Taunton Lily 9th (Vol. 39), s d Copped Hall Clansman (23735).

III. (£2.)—W. White & Sons, **Taunton Jay 7th,** born 6th January; s Caldmore Jay (Vol. 39), d Taunton Amy 12th (Vol. 39), s d Taunton Araby 3rd (27325).

R.—T. H. Tilley, Manor Farm, Biddisham, Axbridge, born 5th January; s Spalding Signal (34103), d Ramsey Belle 19th (80436), s d Wyboston Turk 35th (25053).

Class 200.—*Large White Breeding Sow, farrowed before* 1923. [6 entries.]

I. (£7.)—W. White & Sons, Pool Farm, Taunton, Somerset, **Taunton Amy,** born 2nd July, 1920; s Histon Snowman (24047), d Histon Amy 6th (59812), s d Histon Lion Heart (22481).

II. (£3.)—F. W. Hickton, Bellbroughton, near Stourbridge, **Spalding Queen Mary 9th,** born 18th July, 1919, bred by A. White, Hillegom, Spalding; s Banner of Spalding, d Spalding Queen Mary 3rd, s d Turk of Rayton.

III. (£2.)—The Earl of Ellesmere, Stetchworth Park, Newmarket, **Stetchworth Empress 30th** (70088), born 1st January, 1920; s Stetchworth Kitchener 2nd (24597), d Stetchworth Empress 25th (70078), s d Bourneo of Stetchworth (22169).

Class 201.—*Pair of Large White Breeding Sows, farrowed in* 1923. [4 entries.]

I. (£5.) S. F. Edge's Pig Farms, Ltd., Gallop's Estate Office, Ditchling, Sussex, born 6th January; s Nonsuch of Tockwith 2nd (27069), d Bushes Pride 5th (65564), s d Wyboston Turk 31st (25049).

II. (£3.) W. White & Sons, Pool Farm, Taunton, Somerset, **Taunton Amy 39th** and **40th,** born 6th January; s Caldmore Jay (Vol. 39), d Taunton Amy 12th (Vol. 39), s d Taunton Araby 3rd (27325).

III. (£2.) -W. White & Sons, **Taunton Lilys 20th** and **21st,** born 7th January; s Caldmore Jay (Vol. 39), d Taunton Lily 9th (Vol. 39), s d Copped Hall Clansman (23736).

R.—T. H. Tilley, Manor Farm, Biddisham, Axbridge, born 5th January; s Spalding Signal (34103), d Ramsay Belle 19th (80436), s d Wyboston Turk 35th (25053).

CHAMPION PRIZE.

A Gold Medal or £5 for the best Animal in Classes 198 *to* 201.

I.—T. H. Tilley, Manor Farm, Biddisham, Axbridge, **Kingmaker of Mendip** (33719), born 4th July, 1920, bred by A. W. White, Hillegom, Spalding; s Kingmaker (24151), d Spalding Matchless 3rd (55132), s d Banner of Spalding (21987).

R.—W. White & Sons, Pool Farm, Taunton, Somerset, **Taunton Amy**, born 2nd July, 1920; s Histon Snowman (24047), d Histon Amy 6th (59812), s d Histon Lion Heart (22481).

MIDDLE WHITE.

(£10 towards the Prizes in Classes 202 to 205 and the Champion Prize were given by the National Pig Breeders' Association).

Class 202.—*Middle White Boar, farrowed in* 1920, 1921 *or* 1922. [6 entries.]

I. (£7.)—M. Buckley, Woodchurch, Ashford, Kent, **Histon Milpond** (35161), born 4th February, 1920, bred by J. Chivers, Histon, Cambridge; s Histon Wanderer, d Histon Pianissimo, s d Shrewsbury (19511).

II. (£3.)—S. Bide & Sons, Ltd., Pedigree Pig Farm, Farnham, Surrey, **Dasher of Compton**, born 4th March, 1922, bred by J. H. Holland, Peene House, near Folkestone; s Peene Dasher (3552), d Peene Peace 2nd (74520), s d Boaz of Peene (25169).

III. (£2.)—W. T. B. Cartridge, Sidbury, Worcester, **Peter Pan of Sidbury** (Vol. 40), born 5th June, 1922, bred by W. B. Hill, Wednesfield, Staffs.; s Prestwood Peter Pan (Vol. 39), d Prestwood Royal Alberta (74782), s d Prestwood Acrobat 1st (23197).

R.—S. F. Edge's Pig Farms, Ltd., Gallop's Estate Office, Ditchling, Sussex, **Shipley Samson** (32383), born 8th January, 1920, bred by the Wellington Live Stock Co., Ltd., Pedigree Live Stock Farms, Coolham, Horsham; s Pendley King (32179), d Histom Royal Lady (63104), s d Bookham of Harthay (19369).

Class 203.—*Middle White Boar, farrowed in* 1923. [13 entries.]

I. (£5.)—Brig.-General B. Atkinson, C.B., C.M.G., Mistley Hall, Manningtree, Essex, born 8th January; s Histon Milpond (35161), d Mistley Garland 7th (Vol. 39), s d Wharfedale Frost (32529).

II. (£3.)—S. F. Edge's Pig Farms, Ltd., Gallop's Estate Office, Ditchling, Sussex, born 4th January; s Prestwood Salopian (35597), d Folkestone Lady (Vol. 40), s d First of Caldmore (28027).

III. (£2.)—S. F. Edge's Pig Farms, Ltd., **Albany Viscount 89th**, born 2nd January; s Edenbridge Viscount 3rd (34943), d Albany Sunflower 10th (next vol.), s d Albany Whitebell (27801).

R.—W. T. B. Cartridge, Sidbury, Worcester, born 1st January; s Sidbury Boy King (35733), d Sidbury Cleopatra (87204), s d Pendley Swell (32183).

H.C.—Lieut.-Col. H. Spender-Clay, M.P., Ford Manor, Lingfield, Surrey, **Ear No. 92**, born 18th January; s Shipley Royal Snow, d Wharfedale Impression (75910), s d Preserver of Wharfedale (25493).

CLASS 204.—*Middle White Breeding Sow, farrowed before* 1923. [7 entries.]

I. (£7.)—W. T. B. CARTRIDGE, Sidbury, Worcester, **Sidbury Cleopatra** (87204), born 15th July, 1921 ; s Pendley Swell (32183), d Violet of Beenham (57284), s d Hammond's Moonbeam (21691).

II. (£3.)—S. F. EDGE'S PIG FARMS, LTD., Gallop's Estate Office, Ditchling, Sussex, **Shipley Prise 14th,** (87162), born 3rd July, 1921, bred by L. Harrison and Co., Ltd., Pedigree Live Stock Farms, Coolham, Horsham ; s Pendley King (32179), Shipley Pride 3rd (75332), s d Histon Shrewsbury 2nd (28081)

III. (£2.)—LORD GLANELY, Lackham, Lacock, Wilts, **Rickmansworth May Queen,** born 20th July, 1920, bred by the late Lord Ebury, North Farm, Sotwell, Berks ; s Prestwood Acrobat 5th (28227), d Pendley May Queen (57108), s d Hammonds of Park Hills (19427).

CLASS 205.—*Pair of Middle White Breeding Sows, farrowed in* 1923. [11 entries.]

I. (£5.) LIEUT.-COL. H. SPENDER-CLAY, M.P., Ford Manor, Lingfield, Surrey, **Ear Nos. 285 and 287,** born 7th January ; s Shipley Royal Snow, d Eden Bridge May Queen (83496), s d Weeley Shrewsbury (23267).

II. (£3.)—S. F. EDGE'S PIG FARMS, LTD., Gallop's Estate Office, Ditchling, Sussex, born 4th January ; s Prestwood Salopian (25597), d Folkestone Lady (Vol. 40), s d First of Caldmore.

III. (£2.)—S. BIDE & SONS, LTD., Pedigree Pig Farm, Farnham, Surrey, born 3rd January ; s Major of Compton (Vol. 39), d Patricia of Compton (Vol. 39), s d Albany of Pullington 5th (31113).

R.—LIEUT.-COL. H. SPENDER-CLAY, M.P., **Ear Nos. 293 and 303,** born 18th January ; s Shipley Royal Snow, d Wharfedale Impression (75910), s d Preserver of Wharfedale (25493) ; Ear of 303, s Fordon Benefactor 2nd (34995), d Complexion of Fordmanor (next vol.), s d Pendley King (32179).

V.H.C.—W. T. B. CARTRIDGE, Sidbury, Worcester, born 1st January ; s Sidbury Boy King (35733), d Sidbury Cleopatra (87204), s d Pendley Swell (32183).

CHAMPION PRIZE.

A *Gold Medal or* £5 *for the best Animal in Classes* 202 *to* 205.

I.—W. T. B. CARTRIDGE, Sidbury, Worcester, **Sidbury Cleopatra** (87204), born 15th July, 1921 ; s Pendley Swell (32183), d Violet of Beenham (57284), s d Hammond's Moonbeam (21691).

R.—M. BUCKLEY, Woodchurch, Ashford, Kent, **Histon Milpond** (35161), born 4th February, 1920, bred by J. Chivers, Histon, Cambridge ; s Histon Wanderer, d Histon Pianissimo, s d Shrewsbury (19511).

GLOUCESTERSHIRE OLD SPOTS.

(£30 towards the Prizes in Classes 206 to 211 were given by the Gloucestershire Old Spots Pig Society).

CLASS 206.—*Gloucestershire Old Spots Boar, farrowed before* 1922. [3 entries.]

I. (£7.)—J. W. WOOD, The Grove, Tinten, Mon., **Easton King Eldred** (4526), born 3rd December, 1920, bred by the Marquis of Graham, Easton Park, Suffolk ; s Hodgecombe Bradley (1366), d Clevehill Ada 5th (4436), s d Shipway Prince (284).

II. (£3.)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Stoke Hill Magnet** (4516), born 22nd April, 1921, bred by A. W. Blacker, Hill House, Chew Stoke; s Gilslake Magnet (2823), d Maiden Bradley Princess (5953), s d Bagborough Charm 3rd (363).

CLASS 207.—*Gloucestershire Old Spots Boar, farrowed in* 1922. [9 entries.]

I. (£7.)—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Downside Major** (4907), born 22nd June, bred by Rev. G. B. Hicks, Downside Abbey, Stratton-on-the-Fosse, near Bath; s Downside Loyal (4339), d Downside Blanche (15546), s d Clevehill Captain (2048).

II. (£3.)—A. ROOKSBY, Litchard Hall, Bridgend, **Litchard Major**, born 2nd July; s Berkeley Genuine, d Maiden Bradley Special 2nd, s d Maiden Bradley Pilot.

III. (£2.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester, **Somborne Major** (4679), born 11th January; s Hodgecombe Hero (2016), d Landford Alice (4688), s d Langford Noble (815).

R.—SIR J. ANDERSON, BART., Harrold Priory, Sharnbrook, Beds, **Sonderna Lion**, born 22nd May; s Poulstone Monarch (2950), d Clapcote Logie (9277), s d Kitesnest Jester (881).

H.C.—J. H. THOMAS, Cudleigh Court, Spetchley, Worcester, **Gilslake Viscount**, born 13th August; s Huntingford General, d Gilslake Duchess 5th, s d Winterbourne Son.

CLASS 208.—*Gloucestershire Old Spots Boar, farrowed in* 1923. [10 entries.]

I. (£5.)—J. D. BEAK, Maiden Bradley, Bath, **Maiden Bradley General**, born 27th February; s Ashton Dapper (4627), d Dinedor Barmaid (8390), s d Clevehill Actor (664).

II. (£3.)—J. H. THOMAS, Cudleigh Court, Spetchley, Worcester, **Gilslake Daddy**, born 6th February; s Knowle Viscount, d Gilslake Duchess 3rd, s d Oaklands Hero.

III. (£2.)—J. H. RENNIE, Porthycarne, Usk, Mon., **Gwent King**, born 20th January; s Gwent Dandy (1829), d Gwent Juno 2nd (15292), s d Winterbourne Marquis (1638).

R.—A. ROOKSBY, Litchard Hall, Bridgend, born 12th February; s Frenchay Forester (4125), d Mitcheltroy Magic (13425), s d Birdlip Boss (1675).

CLASS 209.—*Gloucestershire Old Spots Breeding Sow, farrowed before* 1922. [10 entries.]

I. (£7.)—SIR J. ANDERSON, BART., Harrold Priory, Sharnbrook, Beds. **Sonderna Blossom 2nd**, born 20th October, 1920; s Daglingworth Prince (1122), d Hobwell Blossom 2nd (2521), s d Woodlands King (68).

II. (£3.)—J. D. BEAK, Maiden Bradley, Bath, **Maiden Bradley Special** (12606), born June, 1919.

III. (£2.)—J. H. RENNIE, Porthycarne, Usk, Mon., **Gwent Josephine** (15403), born 3rd December, 1921; s Birdlip Boss (1675), d Gwent Juno (5156), s d Jester of Hollywood Tower (457).

R.—MISS B. G. CORY-WRIGHT, Ayot Place, Welwyn, Herts, **Ayot Prunella** (14796), born 19th August, 1921; s Failand Victory (900), d Croxton Fiction 16th (7340), s d Hobwell Monarch (1028).

H.C.—A. ROOKSBY, Litchard Hall, Bridgend, **Maiden Bradley Peerless**, born 26th June, 1921, bred by J. D. Beak, Maiden Bradley, Bath; s Clapcote Leader (1863), d Maiden Bradley Peerless 2nd (10085).

CLASS 210.—*Gloucestershire Old Spots Breeding Sow, farrowed in* 1922. [14 entries.]

I. (£5.)—BENNETT & HOWARD, Quarry Farm, Thornbury, Glos., **Thornbury Beetle 2nd** (15305), born 10th January; s Ashton Bloomer (1741), d Thornbury Beetle (5236), s d Battleborough Prince (627).

II. (£3.)—SIR F. H. BATHURST, BART., D.S.O., Somborne Park, Winchester, **Somborne Anice 2nd** (15396), born 5th March; s Ashley Archer (4295), d Somborne Anice (13839), s d Hodgecombe Hero (2016).

III. (£2.)—MISS B. G. CORY-WRIGHT, Ayot Place, Welwyn, Herts, **Ayot Perhaps** (16707), born 22nd August; s Chalfont Pilot (4064), d Croxton Fiction 16th (7340), s d Hobwell Monarch (1028).

R.—A. ROOKSBY, Litchard Hall, Bridgend, **Litchard Special**, born 2nd July, s Berkeley Genuine (3390), d Maiden Bradley Special 2nd (14686), s d Maiden Bradley Pilot (1918).

H.C.—J. W. WOOD, The Grove, Tintern, Mon., **Lovington Starlight** (15324), born 1st January, bred by R. C. Washington, Lovington Castle Cary; s Stoke Courcy Giljah (3366), d Dorset Susan (9658), s d Bagborough Charm 25th (696).

C.—J. H. THOMAS, Cudleigh Court, Spetchley, Worcester, **Gilslake Snowdrop**, born 12th August; s Withywells Captain, d Gilslake Duchess 3rd, s d Oaklands Hero.—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Downside Rose** (16276), born 22nd June, bred by the Rev. G. B. Hicks, Downside Abbey, Stratton-on-the-Fosse, near Bath; s Downside Loyal (4339), d Downside Blanche (15546), s d Clevehill Captain (2048).

CLASS 211.—*Pair of Gloucestershire Old Spots Breeding Sows, farrowed in* 1923. [9 entries.]

I. (£5.)—J. D. BEAK, Maiden Bradley, Bath, **Maiden Bradley Maid** and **Maid 2nd**, born 20th February; s Ashton Dapper (4627), d Maiden Bradley Barmaid 2nd (14641), s d Maiden Bradley Champion 1st (3858).

II. (£3.)—BENNETT & HOWARD, Quarry Farm, Thornbury, **Thornbury Barrow** and **Thornbury Burrow**, born 15th January; s Ashton Bloomer (1741), d Thornbury Beetle (5236), s d Battleborough Prince (627).

III. (£2.)—J. H. RENNIE, Porthycarne, Usk, Mon., **Gwent Hannah** and **Gwent Harriet**, born 2nd January; s Gwent Dandy (1829), d Knowle Primrose, s d Dumbleton Count (3237).

R.—A. ROOKSBY, Litchard Hall, Bridgend, born 12th February; s Frenchay Forester (4125), d Mitcheltroy Magic (13425), s d Birdlip Boss (1675).

H.C.—A. ROOKSBY, born 12th February; s Frenchay Forester (4125), d Mitcheltroy Magic (13425), s d Birdlip Boss (1675).

C.—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Llantwit Mary** (16904), and **Llantwit Monica** (16903), born 3rd February; s Stoke Hill Magnet (4516), d Downside Spot 1st (13196), s d Clevehill Captain (2048).

CHAMPION PRIZES.

GIVEN BY THE GLOUCESTERSHIRE OLD SPOTS PIG SOCIETY.

The Sir George Watson Challenge Cup, value £21, *for the best Animal in Classes* 206 *to* 211. (*The Cup to be won three times by the same Exhibitor with different animals before becoming his own property*).

I.—BENNETT & HOWARD, Quarry Farm, Thornbury, Glos., **Thornbury Beetle 2nd** (15305), born 10th January; s Ashton Bloomer (1741), d Thornbury Beetle (5236), s d Battleborough Prince (627).

The Deane-Drummond Cup, value £14 14*s.*, *for the best Boar in Classes* 206 *to* 208. (*The Cup to be won twice by the same Exhibitor with different animals before becoming his own property.*)

I.—ALDERMAN F. H. TURNBULL, J.P., Lower House Farm, Llantwit Major, near Cardiff, **Downside Major** (4907), born 22nd June, bred by the Rev G. B. Hicks, Downside Abbey, Stratton-on-the-Fosse, near Bath; s Downside Loyal (4339), d Downside Blanche (15546), s d Clevehill Captain (2048).

GIVEN BY SIR J. ANDERSON, BART.

The Sir John Anderson Challenge Cup, for the best Sow in Classes 209 *to* 211. (*The Cup to be won twice by the same Exhibitor with different animals before becoming his own property*).

I.—BENNETT & HOWARD, Quarry Farm, Thornbury, Glos., **Thornbury Beetle 2nd** (15305), born 10th January; s Ashton Bloomer (1741), d Thornbury Beetle (5236), s d Battleborough Prince (627).

WESSEX SADDLEBACK.

(£24 towards the Prizes in Classes 212 to 216 and the Special Prizes were given by the Wessex Saddleback Pig Society, and all pigs exhibited must be entered or eligible for entry in that Society's Herd Book).

CLASS 212.—*Wessex Saddleback Boar, farrowed before* 1923. [8 entries.]

I. (£7.)—MAJOR A. BREWIS, Polhampton, Overton, Hants, **Norman Polham,** born 25th January, 1921, bred by W. Singer, Norman Court, Salisbury; s Norman Obelisk, d Norman Empress.

II. (£3.)—SIR W. G. WATSON, BART., Sulhamstead House, near Reading, **Oakley Master** (1205), born 6th March, 1922, bred by Major Brewis, Oakley, Hants.; s Norman Polham (661), d Oakley Mary (244), s d Melchet Cooper (2).

III. (£2.)—A. A. MILLARD, Pearash Farm, Penselwood, Bourton, Dorset, **Somerset Hero** (H.B. 1432), born 2nd July, 1922, bred by W. M. Millard, Longford, Shaftesbury, Dorset; s Somerset Ensign (1044), d Somerset Duchess (988).

R.—MISSES F. E. DONISTHORPE and G. DE MONTGEON, Eastington Hall, Upton-on-Severn, **Eastington Rowan** (735), born 24th February, 1921 ; s Ashe Plant (72), d Cattistock Doreen (53).

V.H.C.—MAJOR A. R. WHITTINGTON, Yarty, Axminster, Devon, **Yarty Prince 2nd** (1301), born 30th January, 1923 ; s Yarty Stephen (540), d Yarty Violet (546).

H.C.—SIR A. MOND, BART., M.P., Melchet Court, Romsey, Hants, **Melchet Stephen 1st** (690), born 8th March, 1921 ; s Melchet Prince (155), d Pansy of Melchet (1297), s d Mount William (3).

CLASS 213.—*Wessex Saddleback Boar, farrowed in* 1923. [7 entries.]

I. (£5.)—MAJOR A. BREWIS, Overton, Hants, **Oakley Prior,** born 8th January ; s Ashe Major, d Oakley Prioress, s d Norman Polham.

II. (£3.)—MAJOR A. BREWIS, **Oakley Polham,** born 1st January ; s Norman Polham, d Oakley Stonia.

III. (£2.)—S. WHITE, Offley Grange, Hitchin, Herts, **Offa Hero,** born 2nd January ; s Offa Emperor (1190), d Offa Agatha (1713), s d Norman King Offa.

R.—MAJOR A. BREWIS, **Oakley Lord,** born 11th January ; s Norman Polham, d Oakley Laurel, s d Oakley Beatty.

V.H.C.—MISSES F. E. DONISTHORPE and G. DE MONTGEON, Eastington Hall, Upton-on-Severn, **Eastington Cossack,** born 4th January ; s Eastington Apollo (1187), d Eastington Yaska (5148).

CLASS 214.—*Wessex Saddleback Breeding Sow, farrowed before April* 1, 1922. [9 entries.]

I. (£7.)—SIR W. G. WATSON, BART., Sulhamstead House, near Reading, **Haydwood Grace** (5627), born 17th February, 1922, bred by Osment Bros., Westleigh Farm, Taunton ; s Somerset Emperor (1043), d Haydwood Graceful (3685), s d Pearash Luther (332).

II. (£3.)—S. WHITE, Offley Grange, Hitchin, Herts, **Offa Nitrate 1st** (5036), born 14th February, 1922 ; s Norman King Offa (219), d Norah of Kimbridge (1734), s d Rentpayer of Brightstone (149).

III. (£2.)—A. G. SAY, Badgworth, near Axbridge, Somerset, **Anderson Lady 4th** (4397), born 3rd May, 1921, bred by R. N. Tory, Blandford ; s Shapwick Royal (310), d Anderson Maid (1854), s d Cattistock Norman.

R.—MISSES F. E. DONISTHORPE and G. DE MONTGEON, Eastington Hall, **Upton-on-Severn, Eastington Vanity** (5150), born 14th March, 1922 ; s Eastington Rowan (735), d Eastington Valkyrie (786), s d Baron of Brightstone (111).

V.H.C.—G. R. SOUTHWELL, Holbury Farm, Lockerley, Romsey, Hants, **Holbury Luck** (5668), born 28th March, 1922 ; s Norman Perfection (660), d Holbury Lulu (995), s d Screech Hill Stephen (140).

CLASS 215.—*Wessex Saddleback Breeding Sow, farrowed after April* 1, 1922. [7 entries.]

I. (£7.)—MAJOR A. RREWIS, Polhampton, Overton, Hants, **Oakley Satisfaction,** born 20th April, 1922 ; s Norman Polham, d Oakley Stonia.

II. (£3.)—G. R. SOUTHWELL, Holbury Farm, Lockerley, Romsey, Hants, **Holbury Pink** (5782), born 11th February, 1922; s Norman Perfection (660), d Norman Peace (2838), s d Cattistock Deputy Master (460).

III. (£2.)—S. WHITE, Offley Grange, Hitchen, Herts, **Offa Lassie 2nd** (6984), born 1st July, 1922; s Norman King Offa (219), d Offa Alfrida (1099), s d Cattistock Best Born (87).

R.—SIR A. MOND, BART., M.P., Melchet Court, Romsey, Hants, **Melchet Dinah 8th** (5276), born 12th May, 1922; s Melchet Donegal (355), d Melchet Dinah 3rd (2662), s d Duke of Britain (63).

V.H.C.—SIR W. G. WATSON, BART., Sulhamstead House, near Reading, **Kennet Dora 6th,** born 19th August, 1922; s Ben of Bucklebury (816), d Kennet Beauty 3rd (622), s d Cattistock Nipper (7).

CLASS 216.—*Pair of Wessex Saddleback Breeding Sows, farrowed in* 1923. [6 entries].

I. (£5.)—MAJOR A. BREWIS, Overton, Hants, **Oakley Sonia 2nd** and **Oakley Stonia 3rd,** born 1st January; s Norman Polham, d Oakley Stonia.

II. (£3.)—A. A. MILLARD, Pearash Farm, Penselwood, Bourton, Dorset, **Pearash Forfeit 1st** and **2nd,** born 2nd January; s Pearash Allan (775), d Sutton Forfeit (3996), s d Shelley John (244).

III. (£2.)—MISSES F. E. DONISTHORPE and G. DE MONTGEON, Eastington Hall, Upton-on-Severn, **Eastington Ringlet** and **Eastington Ringwood,** born 8th January; s Eastington Sainfoin (783), d Ringouzel of Eastington (3582), s d Melchet Lieutenant (120).

R.—S. WHITE, Offley Grange, Hitchen, Herts, **Offa Sunshine 1st** and **Offa Sunshine 2nd,** born 2nd January; s Offa Canute (1261), d Offa Doreen (4145), s d Offa Edmund (471).

GOLD MEDAL.

Value £5 5*s.*, *for the best Pig exhibited in Classes* 212 *to* 216, *and a Silver Medal to the Breeder who was not the exhibitor of the Animal winning the Gold Medal.*

I.—MAJOR A. BREWIS, Polhampton, Overton, Hants, **Norman Polham,** born 25th January, 1921, bred by W. Singer, Norman Court, Salisbury; s Norman Obelisk, d Norman Empress.

R.—SIR W. G. WATSON, BART., Sulhamstead House, near Reading, **Haydwood Grace** (5627), born 17th February, 1922, bred by Osment Bros., Westleigh Farm, Taunton; s Somerset Emperor (1043), d Haydwood Graceful (3685), s d Pearash Luther (332).

WELSH.

(£20 of the Prizes in Classes 217 to 221 were given by the Welsh Pig Society).

CLASS 217.—*Welsh Boar,* 12 *months old or over—First prize,* £7—*second,* £3—*third,* £2.

[NO ENTRY.]

CLASS 218.—*Welsh Boar, under* 12 *months old.* [3 entries.]

I. (£5.)—W. J. DAVIES, Preswylfa Peniel Road, Carmarthen, **Ormond Peter 1st,** born 9th July, 1922, bred by D. O. Morgan, Coldpark, Lampeter, Cards. ; s Llew Glanteify (19), d Ormond Megan (175).

II. (£3.)—B. JONES, Trefigin, St. Dogmaels, Pem., **Monington Hero,** born 1st September, 1922, bred by T. Richards, Brigam Farm, Pontyclun, Glam. ; s Brigam Royal (Vol. 2, O.G.P.), d Princess May (Vol. 2, O.G.P.), s d Brigam King (Vol. 1, O.G.P.).

III. (£2.)—H. DAVID, Bryn Farm, Pendoylan, Cowbridge, **Acorn Aristocrat,** born 16th January, 1923 ; s Peterston Samson (Vol. 4, O.G.), d Acorn Elsi (Vol. 3, O.G.).

CLASS 219.—*Welsh Breeding Sow, born not later than July* 1*st*, 1921. *in-farrow, or having farrowed in* 1923. [4 entries.]

I. (£7.)—CAPTAIN N. MILNE HARROP, Gwersyllt Hill, Wrexham, **Peggy Elwyn** (13).

II. (£3.)—D. P. BARNETT, Walterston, Llancarfarn, **Walterston Queen,** born 6th February, 1920, bred by William Morgan, Mardy Newydd, Bonvilston ; s Maesyward General (Vol. 1, O.G.), d Brynteg Lassie (Vol. 1, O.G.).

III. (£2.)—T. THOMAS, Fron-Isaf, Hebron S.O., Carmarthenshire, **Bronwen,** born 19th February, 1920, bred by J. H. Nicolas, Abertigen, Hebron S.O. : s Tigen Beauty.

CLASS 220.—*Welsh Breeding Sow, born after July* 1, 1921, *and not later than August* 1, 1922. [2 entries.]

I. (£7.)—CAPTAIN N. MILNE HARROP, Gwersyllt Hill, Wrexham, **Gwersyllt Barbaric** (210), born 26th July, 1921, bred by J. Evans, Ffynonlas-Isaf, Blaenwaun, Whitland, South Wales ; s Ap Grönw, d Peggy Elwyn.

CLASS 221.—*Welsh Breeding Sow, born after August* 1*st*, 1922. [4 entries.]

I. (£5.)—CAPTAIN N. MILNE HARROP, Gwersyllt Hill, Wrexham, **Gwersyllt Catalina 3rd,** born 5th September, 1922 ; s Tyssul Cawr, d Peggy Elwyn.

II. (£3.)—D. M. THOMAS, Maes Canorw, Login S.O., Carmarthenshire, **White Bud,** born 30th October, 1922, bred by T. Thomas, Fron Isaf, Hebron S.O. ; s Rhedynog Elwyn, d Bronwen.

III. (£2.)—W. THOMAS, Bwrws, Hebron S.O., **Miss Murphy,** born 30th October, 1922, bred by T. Thomas, Fron Isaf, Hebron S.O. ; s Rhedynog Elwyn, d Bronwem.

R.—L. M. PHILLIPS, Llan Farm, Hebron S.O., Carmarthenshire, **Llan Nonna,** born 15th November, 1922 ; s Llew Taf, d Llan Clydwen, s d Yr Hen Wr.

LONG WHITE LOP-EARED.

(£31 10s. 0d. towards the Prizes in Classes 222 to 224 were given by the Long White Lop-Eared Pig Society).

CLASS 222.—*Long White Lop-Eared Boar, any age.* [3 entries.]

I. (£7.)—W. H. NEAL, Yealmpstone Farm, Plympton, South Devon, **Quither Masterpiece** (122), born 5th July, 1921, bred by W. Mashford, Quither, Milton Abott ; s Quither General (2), d Quither Dainty (3).

II. (**£3.**)—A. A. Partridge, Mordref, Plympton, Devon, **Priory Masterpiece,** born 14th September, 1922; s Quither Masterpiece (122), d Torlands Anxious (161), s d Roborough Jumbo (20).

III. (**£2.**)—H. J. Kingwell, Bow Grange, Totnes, Devon, **Devonshire Snowman,** born 5th November, 1923; s Torland Jumbo (54), d Ipplepen Snowdrop (257), s d Yett Masterman.

Class 223.—*Long White Lop-Eared Sow, any age, in-farrow, or with farrow, not exceeding eight weeks old on the 1st day of Show.* [2 entries.]

I. (**£7.**)—A. A. Partridge, Mordref, Plympton, Devon, **Torlands Anxious** (161), born 14th March, 1921, bred by T. H. Spry, Alston, Yelverton, Devon; s Roborough Jumbo (20), d Netherton Sara (157).

II. (**£3.**)—M. H. Moore, The Hellyers, Ipplepen, Devon, **Ipplepen Myrtle** (603), Ear Tag (373), born 10th July, 1922; s Torland Jumbo (44), d Ipplepen Pride (253).

Class 224.—*Pair of Long White Lop-Eared Breeding Sows, farrowed in* 1923. [3 *entries.*]

I. (**£7.**)—W. H. Neal, Yealmpton Farm, Plympton, South Devon, born 9th January; s Quither Masterpiece (122), d Yealmpstone Madam (419).

II. (**£3.**)—H. J. Kingwell, Bow Grange, Totnes, **Devonshire White Heather 1st** and **2nd,** born 4th February; s Torland Jumbo (54), d Ipplepen White Heather, s d Yett Masterman.

III. (**£2.**)—M. H. Moore, The Hellyers, Ipplepen, Devon, **Ipplepen Daisy** and **Ipplepen Lily,** born 12th February; s Torland Jumbo (54), d Ipplepen Pride (253).

PRODUCE.

CIDER.

Class 225.—*Cask of not less than* 9 *and not more than* 30 *gallons of Cider, made in* 1922, *of a specific gravity not exceeding* 1.015 *at* 60 *deg. Fahr.* [8 entries.]

I. (**£5.**)—Pullin Bros.

II. (**£3.**)—H. J. Davis.

III. (**£2.**)—H. J. Davis.

R.—Quantock Vale Cider Co. (Ld.).

Class 226.—12 *Quart Bottles of Cider, made in* 1922, *of a specific gravity not exceeding* 1.015 *at* 60 *deg. Fahr.* [13 entries.]

I. (**£5.**)—J. M. Parry & Co. (Ld.).

II. (**£3.**)—J. M. Parry & Co. (Ld.).

III. (**£2.**)—H. J. Davis.

R.—H. J. Davis.

C.—Pullin Bros.

Class 227.—*Cask of not less than* 9 *and not more than* 30 *gallons of Cider, made in* 1922. [9 entries.]

I. (**£5.**)—H. J. Davis.

II. (**£3.**)—H. J. Davis.

III. (**£2.**)—Quantock Vale Cider Co. (Ld.).

R.—Quantock Vale Cider Co. (Ld.).

C.—Williams Bros.

Class 228.—12 *Quart Bottles of Cider, made in* 1922. [17 entries.]

I. (**£5.**)—Pullin Bros.

II. (**£3.**)—Quantock Vale Cider Co. (Ld.).

III. (**£2.**)—Quantock Vale Cider Co. (Ld.).

R.—H. J. Davis.

V.H.C.—H. J. Davis.

H.C.—J. M. Parry & Co. (Ld.).—J. M. Parry & Co. (Ld.).

Class 229.—12 *Quart Bottles of Cider, made in any year previous to* 1922. [9 entries.]

I. (**£5.**)—J. M. Parry & Co. (Ld.).

II. (**£3.**)—J. L. Yeomans.

III. (**£2.**)—J. W. Davies.

R.—J. W. Davies.

C.—J. M. Parry & Co. (Ld.).

CHEESE.

Class 230.—*Three Cheddar Cheeses* (*not less than* 56*lbs. each*), *made in* 1922. [9 entries.]

I. (**£10.**)—Mrs. S. J. Steeds.

II. (**£7.**)—W. H. Collins,

III. (**£4.**)—Miss M. Portch.

R.—G. R. Cole.

H.C.—H. H. Pickford.

Class 231.—*Three Cheddar Cheeses* (*not over* 56*lbs. each*), *made in* 1922. [9 entries.]

I. (**£8.**)—S. T. White.

II. (**£5.**)—W. H. Collins.

III. (**£3.**)—P. H. Clarke.

R.—Miss M. Portch.

V.H.C.—M. M. Tabor.

CLASS 232.—*Four Loaf or other Truckle Cheeses, made in* 1922. [14 entries.]

I. (£5.)—W. H. COLLINS.

II. (£3.)—W. B. WHITE.

III. (£2.)—H. H. PICKFORD.

R.—Miss M. PORTCH.

V.H.C.—CARY & GRIMSDELL.

CLASS 233.—*Three Caerphilly Cheeses, made in* 1923. [8 entries.]

I. (£5.)—COX & SONS.

II. (£3.)—T. H. TILLEY.

III. (£2.)—MRS. E. WATTS.

H.C.—A. F. SOMERVILLE.

(The Prizes in Classes 234 and 235 were offered by the Glamorgan Agricultural Committee and were open only to residents in the Administrative County of Glamorgan who had attended Dairying Courses or Classes in the County and had not won a Prize for Caerphilly Cheese at the London Dairy Show or the Shows of the Royal, Bath and West, or Welsh National Agricultural Societies).

CLASS 234.—*Three Caerphilly Cheeses, made in* 1923, *by Students who had attended the Glamorgan County Council Travelling Dairy School—First prize,* £2—*second,* £1—*third,* 10*s.*

[NO ENTRY.]

CLASS 235.—*Three Caerphilly Cheeses, made in* 1923, *by Students who had attended courses in Dairying at the University College, Cardiff.* [5 entries.]

I. (£2.)—MISS N. L. WATTS.

II. (£1.)—MISS B. HARRIES.

CREAM CHEESE, BUTTER AND CREAM.

(These Classes were not open to Professional Teachers).

CLASS 236.—*Three Cream or other Soft Cheeses.* [7 entries.]

I. (£3.)—MISS E. S. JAMES.

II. (£2.)—T. R. BOLITHO.

III. (£1.)—BENNETT & HOWARD.

R.—E. JONES.

CLASS 237.—*2lbs. of Fresh (or very slightly salted) Butter.* [32 entries.]

I. (£4.)—T. R. BOLITHO.

II. (£3.)—MISS E. BEER.

III. (£2.)—MRS. L. R. MILDON.

IV. (£1.)—Mrs. J. Way.

R.—J. Q. Rowett.

V.H.C.—A. F. Somerville.

H.C.—Miss E. S. James.

C.—Sir R. A. Morris, Bart.

Class 238.—*2lbs. of Butter, in the making of which no salt had been used, judged on the last day of the Show.* [*27 entries.*]

I. (£4.) Mrs. C. E. Faull.

II. (£3.)—J. Q. Rowett.

III. (£2.)—Miss E. S. James.

IV. (£1.) T. R. Bolitho.

R.—A. F. Somerville.

V.H.C.—Mrs. J. Way.

H.C. Lord Treowen.

Class 239.—*12lbs. of Keeping Butter, in a jar or crock, delivered to the Secretary* 4 *weeks before the Show.* [8 entries.]

I. (£5.)—Mrs. L. R. Mildon.

II. (£4.) Mrs. M. M. Evans.

III. (£3.) Mrs. A. A. Bere.

R.—Mrs. W. E. Davies.

Class 240. *Four half-pounds of Scalded Cream.* [6 entries.]

I. (£3.) Mrs. L. R. Mildon.

II. (£2.) Sir R. A. Morris, Bart.

III. (£1.)—W. Beer.

R.—Mrs. W. R. Beer.

(The Prizes in Classes 241 and 242 were given by the Glamorgan Agricultural Committee and were open only to Students resident in the Administrative County of Glamorgan who had attended the Dairying Courses at the University College, Cardiff, or the Glamorgan County Council Travelling Dairy School, and had not won a prize for Butter at the London Dairy Show or the Shows of the Royal, Bath and West, or Welsh National Agricultural Societies).

Class 241.—*2lbs. of Fresh, or very slightly salted Butter.* [13 entries.]

I. (£2.) Miss F. Watts.

II. (£1.)—Miss C. Thomas.

III. (10s.)—Miss L. Thomas.

R.—Miss M. Davies.

V.H.C.—Miss C. Edwards.

H.C.—Mrs. M. Thomas.

Class 242.—*2lbs. of Fresh Butter, in the making of which no salt had been used.* [13 entries.]

I. (£2.)—Miss N. L. Watts.

II. (£1.)—Miss C. Edwards.

III. (£10s.)—Miss L. Thomas.

R.—Miss M. Davies.

V.H.C.—Miss C. Thomas.

H.C.—Miss E. E. Morris.

COMPETITIONS.

BUTTER-MAKING.

(No winner of a First Prize given by this Society for Butter-making during the last three years was eligible to compete in Classes 244 or 245).

Class 243.—*For Children under* 14 *years of age, attending School. On the first day of the Show.* [1 entry.]

I. (£3.)—Miss L. G. Thomas.

Class 244.—*For Men and Women, bona fide workers on a farm. On the second day of the Show.* [20 entries.]

I. (£4.)—Miss R. M. Gwillim.

II. (£3.)—Miss E. M. Price.

III. (£1 10s.)—Miss B. John.

IV. (£1.)—Miss E. Holloway.

R.—Miss D. M. Watts.

V.H.C.—Miss M. Davies.—Miss A. Morgan.

H.C.—Miss R. James.—Miss E. A. Jenkins.

Class 245.—*For Students who had been through a course of instruction in Butter-making at any County Council School, and who had not previously won a first or second prize at one of the Society's Shows. On the third day of the Show.* [20 entries.]

I. (£4.)—Miss E. J. Edwards.

II. (£3.)—Miss E. Plummer.

III. (£1 10s.)—Miss E. Holloway.

IV. (£1.)—Miss F. M. Eckley.

R.—Miss A. Rugman.

V.H.C.—Miss F. Scott.

H.C.—Miss D. M. Watts.

(The Prizes in Classes 246 and 247 were given by the Glamorgan Agricultural Committee and were open only to residents in the Administrative County of Glamorgan who had attended Dairying Courses or Classes in the County and had not won a prize for Butter-making at the London Dairy Show or the Shows of the Royal, Bath and West or Welsh National Agricultural Societies).

CLASS 246.—*For Students who had attended the Dairying Courses at the University College, Cardiff. On the third day of the Show.* [17 entries.]

I. (£3.)—MISS D. M. WATTS.
II. (£2.)—MISS N. L. WATTS.
III. (£1.)—MISS E. E. MORRIS.
IV. (10s.)—MISS R. G. DAVID.
R.—MISS C. EDWARDS.
V.H.C.—MISS E. A. JENKINS.
H.C.—MISS M. NICHOLAS.
C.—MISS R. A. BEVAN.

CLASS 247.—*For Students who had attended the Glamorgan County Council Travelling Dairy School On the fourth day of the Show.* [20 entries.]

I. (£3.)—MISS F. SCOTT.
II. (£2.)—MISS M. DAVIES.
III. (£1.)—MISS C. A. EDWARDS.
IV. (10s.)—MISS C. THOMAS.
R.—MISS F. WATTS.
V.H.C.—MISS L. THOMAS.
H.C.—MISS L. RICHARDS.
C.—MISS A. E. BENJAMIN.

CLASS 248.—*For Men and Women. On the fourth day of the Show.* [20 entries.]

I. (£4.)—MISS E. HOLLOWAY.
II. (£3.)—MISS A. M. JONES.
III. (£1 10s.)—MISS L. THOMAS.
IV. (£1.)—MISS N. L. WATTS.
R.—MISS F. SCOTT.
V.H.C.—MISS C. PANTALL.
H.C.—MISS R. JAMES.
C.—MRS. E. M. MORTIMER.

Class 249.—*For Winners of First and Second Prizes in the Butter-making Classes* 243 *to* 248, *or at any previous meeting of the Society. On the fifth day of the Show.* [18 entries.]

I. (**Gold Medal.**)—Miss R. James.

II. (**Silver Medal.**)—Miss E. M. Price.

III. (**Bronze Medal.**)—Miss C. Pantall.

R.—Miss R. M. Gwillim.

MILKING.

Class 250.—*For Men,* 16 *years of age and over. On the second day of the Show.* [2 entries.]

I. (**£1 10s.**)—W. R. Beer.

Class 251.—*For Women,* 16 *years of age and over. On the first day of the Show.* [3 entries.]

I. (**£1 10s.**)—Miss A. D. Jones.

II. (**£1.**) Miss L. Richards.

Class 252.—*For Boys and Girls under* 16 *years of age. On the third day of the Show.* [2 entries.]

I. (**£1 10s.**)—Miss R. M. Thomas.

II. (**£1.**)—Miss L. G. Thomas.

(The Prizes in Class 253 were given by the Glamorgan Agricultural Committee).

Class 253.—*For Residents in the Administrative County of Glamorgan who had attended the Dairying Courses at the University College, Cardiff, or the Glamorgan County Council Travelling Dairy School, and had not won a prize for Milking at the London Dairy Show or the Shows of the Royal, Bath and West, or Welsh National Agricultural Societies. On the fourth day of the Show.* [14 entries.]

I. (**£1 10s.**)—Miss E. M. Thomas.

II. (**15s.**)—L. Rees.

III. (**10s.**)—Miss M. J. Jones.

IV. (**5s.**)—Miss K. F. Jones.

R.—Miss E. E. Morris.

SHOEING.

Class 254.—*For Cart Horse Shoeing by Smiths who had not previously won a First Prize in an open class for Horse Shoeing at one of the Society's Shows. On the second day of the Show.* [41 entries.]

I. (**£4.**)—J. H. Price.

II. (**£3.**) J. Lewis, R.S.S.

III. (**£2.**)—A. E. Watkins, A.F.C.L.

IV. (**£1.**)—D. Jones, R.S.S.

V.H.C.—J. Theophilus.

H.C.—J. Jones.—P. Williams.

C.—A. Thomas, R.S.S.—J. Thomas.

SPECIAL PRIZES.

Given by the Swansea Local Committee.

Best Competitors in Class 254, *resident in the Counties of Glamorgan, Carmarthen, Pembroke, Cardigan, Brecon or Radnor.*

I. (**£2.**)—J. H. Price.

II. (**£1.**)—J. Lewis.

R.—A. E. Watkins.

Class 255.—*For Nag Horse Shoeing, by Smiths who had not previously won a First Prize in an open Class for Horse Shoeing at one of the Society's Shows. On the third day of the Show.* [28 entries.]

I. (**£4.**)—D. Jones, R.S.S.

II. (**£3.**)—W. L. Davies, R.S.S.

III. (**£2.**)—J. O. Mathias, R.S.S.

IV. (**£1.**)—W. Morgan.

V.H.C.—T. Rees.—J. R. Roberts, R.S.S.

H.C.—W. Jones, R.S.S.

C.—A. Thomas, R.S.S.

SPECIAL PRIZES.

Given by the Swansea Local Committee.

Best competitors in Class 255, *resident in the Counties of Glamorgan, Carmarthen, Pembroke, Cardigan, Brecon or Radnor.*

I. (**£2.**)—D. Jones.

II. (**£1.**)—W. L. Davies.

R.—J. O. Mathias.

Class 256.—*Champion Class. For Cart Horse Shoeing by previous winners of a First Prize at the Society's Show or a First Prize at any National or County Agricultural Society's Show. On the fourth day of the Show.* [17 entries.]

I. (**£4.**)—J. Tomlinson, A.F.C.L.

II. (**£3.**)—J. Lewis, R.S.S.

III. (**£2.**)—T. Lewis, R.S.S.

IV. (£1.)—J. Davies, R.S.S.

H.C.—A. E. Watkins, A.C.F.L.

Class 257.—*For Shoe Making or Turning, by Smiths, the patterns and descriptions of the Shoes to be supplied by the Judge. On the fourth day of the Show.* [14 entries.]

I. (£4.)—J. O. Mathias, R.S.S.

II. (£3.)—J. R. Roberts, R.S.S.

III. (£1.)—W. L. Davies, R.S.S.

IV. (10s.)—J. Griffiths.

TIMBERING AND SPLICING.

(The Prizes in Classes 258 and 259 were given by the Swansea Local Committee).

Class 258.—*Timbering Competition, open to Timbermen and Colliers. On the fourth day of the Show.* [10 entries.]

I. (£4.)—G. Dickson and A. Wyles.

II. (£2.)—T. Rowlands and Partner.

III. (£1.)—T. and I. Blackwell.

R.—J. Jones and Partner.

Class 259.—*For the best Splice in Colliery Rope. On the fourth day of the Show.* [5 entries.]

I. (£4.)—D. Griffiths, M. Griffiths, H. Davies and W. Davies.

II. (£2.)—T. Lewis, T. E. Morgan, E. Evans and F. T. Williams.

III. (£1.)—J. R. Davies, L. L. Jones, W. J. Davies and R. Williams.

POULTRY.

(UNDER POULTRY CLUB RULES.)

(The Birds in Classes 1 to 49 must have been hatched previous to January 1st, 1923.)

CLASS 1.—ANY TWO PURE BREEDS, BEST MATED TO CROSS FOR PRODUCING TABLE POULTRY—COCK AND THREE HENS, BRED IN 1921 OR 1922 (THE PROPERTY OF ONE EXHIBITOR. [5 entries.]

I. (£3.)—J. H. BAKER & SONS, *Indian Game and Light Sussex.*

II. (£2.)—H. N. HODGES, *Indian Game and Sussex.*

R.—J. NAGLE, *Old English Game and Brown Sussex.*

H.C.—MISS P. O. HALLORAN, *White Malines and Sussex.*

C.—J. NAGLE, *Old English Game and Light Sussex.*

CLASS 2.—COCHIN OR BRAHMA, COCK. [3 entries.]

I. (£1.)—R. M. THOMAS, *Brahma.*

R.—G. LANE, *Partridge Cochin.*

CLASS 3.—COCHIN OR BRAHMA, HEN. [4 entries.]

I. (£1.)—R. M. THOMAS, *Brahma.*

II. (15s.)—R. M. THOMAS, *Brahma.*

R.—MRS. W. RICHARDS, *Brahma.*

CLASS 4.—PLYMOUTH ROCK (BARRED), COCK. [6 entries.]

I. (£1.)—W. H. COOK.

II. (15s.)—D. JONES.

III. (10s.)—J. HUGHES-REES.

R.—R. J. MOORE.

CLASS 5.—PLYMOUTH ROCK (BARRED), HEN. [5 entries.]

I. (£1.)—B. L. ROSKELLY.

II. (15s.)—W. H. COOK.

R.—D. JOHN.

H.C.—F. J. THOMAS.

CLASS 6.—PLYMOUTH ROCK (ANY OTHER VARIETY), COCK. (10 entries.]

I. £1.)—MAJOR J. A. MORRISON, D.S.O.

II. (15s.)—W. G. LLEWELLYN, *White.*

III. (10s.)—A. BISHOP, *Buff.*

R.—F. J. THOMAS.

V.H.C.—E. STEPHENS.

H.C.—J. T. JONES.—R. MORGAN.—T. NASH.

Class 7.—PLYMOUTH ROCK (Any other Variety), HEN. [4 entries.]

I. (£1.)—Major J. A. Morrison, D.S.O.

II. (15s.)—D. B. Chesterfield, *White*.

R.—W. G. Llewellyn, *White*.

H.C.—F. J. Thomas.

Class 8.—ORPINGTON (Buff), COCK. [9 entries.]

I. (£1.)—F. M. Rogers.

II. (15s.)—W. H. Cook.

III. (10s.)—T. Evans.

R.—Park House Poultry Farm.

V.H.C.—Mrs. J. Davies.—Evans Bros.—W. Jenkins.

H.C.—W. S. Baily.

Class 9.—ORPINGTON (Buff), HEN. [5 entries.]

I. (£1.)—W. H. Cook.

II. (15s.)—F. M. Rogers.

R.—Evans Bros.

V.H.C.—P. T. Beynon.

H.C.—P. T. Beynon.

Class 10.—ORPINGTON (Any other Variety), COCK. [14 entries.]

I. (£1.)—A. Skinner.

II. (15s.)—J. Miller.

III. (10s.)—G. Spencer.

R.—Major J. A. Morrison, D.S.O.

V.H.C.—Mrs. J. Davies, *Black*.—B. James.—T. Phillips.

H.C.—W. H. Cook.—A. Morris, *Black*.

Class 11.—ORPINGTON (Any other Variety), HEN. [16 entries.]

I. (£1.)—M. Linder, *White*.

II. (15s.)—G. Spencer.

III. (10s.)—A. Skinner, *Black*.

R.—W. H. Cook.

V.H.C.—Mrs. E. C. Wallace, *White*.

H.C.—M. Linder, *Black*.—T. Phillips.—G. Thomas.

Class 12.—MINORCA, COCK. [1 entry.]

I. (£1.)—Fursland Bros.

Class 13.—MINORCA, HEN. [8 entries.]

I. (£1.)—Fursland Bros.

II. (15s.)—Fursland Bros.

III. (10s.)—J. Jones.

R.—J. L. Evans.

H.C.—C. Ford.—Nicholls & Son.

Class 14.—RHODE ISLAND RED, COCK. [26 entries.]

I. (£1.)—G. Spencer.

II. (15s.)—J. H. Baker & Sons.

III. (10s.)—W. H. Cook.

R.—W. H. Snell.

V.H.C.—A. F. Morley.—I. H. Radcliffe.—W. H. Symons.

H.C.—G. T. Andrew.—R. Bevan.—J. Owen & Son.—I. H. Radcliffe.—Wylde Mill Poultry Farm.

Class 15.—RHODE ISLAND RED, HEN. [12 entries.]

I. (£1.)—J. H. Baker & Sons.

II. (15s.)—G. T. Andrew.

III. (10s.)—A. Scott.

R.—Wylde Mill Poultry Farm.

V.H.C.—J. H. Evans.—G. Spencer.—W. J. Williams.

H.C.—I. H. Radcliffe.—W. Ress.

Class 16.—SUSSEX (Speckled), COCK. [5 entries].

I. (£1.)—Major J. A. Morrison, D.S.O.

II. (15s.)—D. D. Price.

R.—A. J. Falkenstein.

H.C.—W. Snell.

Class 17.—SUSSEX (Speckled), HEN. [6 entries.]

I. (£1.)—Major J. A. Morrison, D.S.O.

II. (15s.)—W. Snell.

III. (10s.)—A. J. Falkenstein.

V.H.C.—J. Nagle.

Class 18.—SUSSEX (Any Other Variety), COCK. [16 entries.]

I. (£1.)—A. J. Falkenstein.

II. (15s.)—Park House Poultry Farm.

III. (10s.)—Major J. A. Morrison, D.S.O.

R.—T. J. Isaac.

V.H.C.—Major J. A. Morrison, D.S.O.—J. Walters.

H.C.—T. W. Hill.—Preston Hall Poultry Farm.

CLASS 19.—SUSSEX (ANY OTHER VARIETY), HEN. [19 entries.]

I. (£1.)—A. J. FALKENSTEIN.

II. (15s.)—F. M. ROGERS.

III. (10s.)—G. SPENDER.

V.H.C.—H. GRIFFITHS & SON.—H. GUNN.—MAJOR J. A. MORRISON, D.S.O. —PRESTON HALL POULTRY FARM.

H.C.—J. H. BAKER & SONS.—H. GRIFFITHS & SON.—MAJOR J. A. MORRISON, D.S.O.

CLASS 20.—DORKING (ANY VARIETY), COCK. [4 entries.]

I. (£1.)—I. G. DENTON.

II. (15s.)—G. T. JENKINS.

R.—A. J. MAJOR.

V.H.C.—A. J. MAJOR.

CLASS 21.—DORKING (ANY VARIETY), HEN. [2 entries.]

I. (£1.)—A. J. MAJOR.

R.—A. J. MAJOR.

CLASS 22.—LANGSHAN, COCK OR HEN. [10 entries.]

I. (£1.)—H. R. JONES.

II. (15s.)—PARK HOUSE POUTLRY FARM.

III. (10s.)—R. TWIGG.

R.—E. E. THOMES.

V.H.C.—C. G. LINDLEY.

H.C.—C. G. LINDLEY.—C. G. LINDLEY.

CLASS 23.—WYANDOTTE (SILVER OR GOLD LACED), COCK. [6 entries.]

I. (£1.)—ABBOT BROS., *Gold.*

II. (15s.)—MRS. T. ABBOT, *Silver.*

III. (10s.)—B. L. ROSKELLY, *Gold.*

R.—W. A. & R. F. SPENCER, *Gold.*

CLASS 24.—WYANDOTTE (SILVER OR GOLD LACED), HEN. [3 entries.]

I. (£1.)—MRS. T. ABBOT, *Silver.*

II. (15s.)—ABBOT BROS,. *Gold.*

CLASS 25.—WYANDOTTE (WHITE), COCK. [14 entries.]

I. (£1.)—B. L. ROSKELLY.

II. 15s.)—H. GUNN.

III. (10s.)—R. DANIELS.

R.—PRESTON HALL POULTRY FARM.

V.H.C.—Preston Hall Poultry Farm.
H.C.—W. Cory.
C.—A. D. Mitchell.

Class 26.—WYANDOTTE (White), HEN. [14 entries.]

I. (£1.)—H. Gunn.
II. (15s.)—D. G. Williams.
III. (10s.)—B. L. Roskelly.
R.—J. Bolt.
V.H.C.—A. D. Mitchell.
H.C.—D. Hoare.

Class 27.—WYANDOTTE (Black), COCK. [6 entries.]

I. (£1.)—S. Jones.
II. (15s.)—W. W. Thomas.
III. (10s.)—W. W. Thomas.
R.—S. Jones.
H.C.—J. Adams.

Class 28.—WYANDOTTE (Black), HEN. [3 entries.]

I. (£1.)—W. W. Thomas.
II. (15s.)—W. W. Thomas.
R.—J. Adams.

Class 29.—WYANDOTTE (Any Other Colour), COCK. [3 entries.]

I. (£1.)—Wylde Mill Poultry Farm, *Columbian.*
II. (15s.)—J. Mellor, *Partridge.*
R.—S. Evans, *Blue.*

Class 30.—WYANDOTTE (Any Other Colour), HEN. [5 entries.]

I. (£1.)—J. Mellor, *Partridge.*
II. (15s.)—S. Evans, *Blue.*
R.—Wylde Mill Poultry Farm, *Columbian.*
H.C.—S. Evans, *Blue.*

Class 31.—LEGHORN (White), COCK. [4 entries.]

I. (£1.)—A. H. Stanbury.
II. (15s.)—G. Spencer.
R.—D. Erasmus.

CLASS 32.—LEGHORN (WHITE), HEN. [10 entries.]

I. (£1.)—G. SPENCER.
II. (15s.)—T. REES.
III. (10s.)—A. H. STANBURY.
R.—A. BISHOP.
V.H.C.—W. I. REES.
H.C.—A. THOMAS.
C.—T. REES.

CLASS 33.—LEGHORN (ANY OTHER COLOUR), COCK. [9 entries.]

I. (£1.)—J. LEWIS, *Brown.*
II. (15s.)—E. L. SIMON, *Brown.*
III. (10s.)—J. RABEY, *Duckwing.*
R.—W. MORGANS.
V.H.C.—W. I. REES.
H.C.—E. L. SIMON, *Brown.*

CLASS 34.—LEGHORN (ANY OTHER COLOUR), HEN. [9 entries.]

I. (£1.)—R. HIGGS, *Silver Duckwing.*
II. (15s.)—F. G. EDWARDS.
III. (10s.)—G. F. LUCAS & W. J. HOWARD, *Black.*
R.—F. G. EDWARDS.
H.C.—E. DAVIES, *Black.*

CLASS 35.—HAMBURG (ANY VARIETY), COCK. [3 entries.]

I. (£1.)—W. SNELL, *Gold Pencilled or Black.*
II. (15s.)—G. HARRIS.
R.—T. EVANS, *Black.*

CLASS 36.—HAMBURG (ANY VARIETY), HEN. [3 entries.

I. (£1.)—W. H. AVERY.
II. (15s.)—W. SNELL, *Black.*
R.—D. EVANS.

CLASS 37.—OLD ENGLISH GAME (BLACK RED), COCK. [4 entries.]

I. (£1.)—J. NAGLE.
II. (15s.)—D. OWEN.
R.—MISS L. WORNER.

CLASS 38.—OLD ENGLISH GAME (BLACK RED), HEN. [3 entries.]

I. (£1.)—F. W. FOREY.
II. (15s.)—D. OWEN.
R.—J. NAGLE.

CLASS 39.—OLD ENGLISH GAME (ANY OTHER COLOUR), COCK. [11 entries.]

I. (£1.)—MASON & NEWMAN, *Old English Gray.*

II. (15s.)—F. W. FOREY.

III. (10s.)—J. NAGLE, *Spangle.*

R.—J. GRAVES.

V.H.C.—EDWARDS & MORGANS, *Brown Red.*

H.C.—MORGAN & EDWARDS.

CLASS 40.—OLD ENGLISH GAME (ANY OTHER COLOUR), HEN. [10 entries.]

I. (£1.)—F. W. FOREY.

II. (15s.)—EDWARDS & MORGANS, *Brown Red.*

III. (10s.)—W. BOBBETT.

R.—EDWARDS & MORGANS, *Brown Red.*

V.H.C.—E. EDWARDS.

H.C.—MAJOR J. A. MORRISON, D.S.O.

CLASS 41.—INDIAN GAME, COCK. [15 entries.]

I. (£1.)—J. H. BAKER & SONS.

II. (15s.)—F. HOLT.

III. (10s.)—G. HUGHES.

R.—G. T. ANDREW.

V.H.C.—F. E. BRAY.

H.C.—W. JEFFRIES.

CLASS 42.—INDIAN GAME, HEN. [12 entries.]

I. (£1.)—NORTHCOTT & SON.

II. (15s.)—J. H. BAKER & SONS.

III. (10s.)—D. RICHARDS.

R.—WATERS & ISAAC.

V.H.C.—W. J. CAMP.

CLASS 43.—FRENCH (INCLUDING FAVEROLLES), COCK. [7 entries.]

I. (£1.)—R. M. THOMAS, *Houdan.*

II. (15s.)—W. H. COOK, *Blue Faverolle.*

III. (10s.)—R. M. THOMAS, *Houdan.*

R.—G. HENWOOD.

V.H.C.—W. PEAT, *Faverolle.*

CLASS 44.—FRENCH (INCLUDING FAVEROLLES), HEN. [5 entries.]

I. (£1.)—R. M. THOMAS, *Houdan.*

II. (15s.)—G. HENWOOD

R.—R. M. THOMAS, *Houdan.*

H.C.—PRESTON HALL POULTRY FARM, *Faverolle.*

CLASS 45.—ANCONA, COCK. [5 entries.]

I. (£1.)—W. SMALLCOMBE.

II. (15s.)—E. HUGHES.

R.—J. BRUNKER.

H.C.—W. LONG.

CLASS 46.—ANCONA, HEN. [6 entries.]

I. (£1.)—J. I. LACE.

II. (15s.)—D. EVANS.

III. (10s.)—A. T. WEATHERLEY.

R.—T. DAVIES.

H.C.—J. JONES.

CLASS 47.—ANY OTHER DISTINCT BREED NOT PREVIOUSLY MENTIONED (EXCLUDING BANTAMS), COCK. [9 entries.]

I. (£1.)—J. JOHNS, *Brown Red Modern Game.*

II. (15s.)—ABBOT BROS., *Andalusian.*

III. (10s.)—H. F. THOMAS, *Modern Game.*

R.—J. H. BAKER & SONS, *Malay.*

V.H.C.—MAJOR J. A. MORRISON, D.S.O.

H.C.—MRS. M. A. ADAMS, *Barnevelder.*

CLASS 48.—ANY OTHER DISTINCT BREED NOT PREVIOUSLY MENTIONED (EXCLUDING BANTAMS), HEN. [7 entries.]

I. (£1.)—J. EDWARDS, *Jubilee Indian Game.*

II. (15s.)—MAJOR J. A. MORRISON, D.S.O.

III. (10s.)—ABBOT BROS., *Andalusian.*

R.—MRS. M. A. ADAMS, *Barnevelder.*

H.C.—A. GOLLEGE, *Black Red Game.*

SELLING CLASSES.

CLASS 49.—ANY DISTINCT BREED, COCK OR COCKEREL (PRICE NOT TO EXCEED £1 1s.). [10 entries.]

I. (£1.)—J. H. BAKER & SONS.

II. (15s.)—G. T. ANDREW, *Malay.*

III. (10s.)—MISS E. M. STUTTAFORD, *Rhode Island Red.*

R.—J. HUGHES, *Black Orpington.*

V.H.C.—J. H. RADCLIFFE, *Rhode Island Red.*

H.C.—M. LINDNER, *White Orpington.*—J. H. RADCLIFFE, *Rhode Island Red.*

CLASS 50.—ANY DISTINCT BREED, HEN OR PULLET (PRICE NOT TO EXCEED £1 1s.). [6 entries.]

I. (**£1.**)—J. H. BAKER & SONS.

II. (**15s.**)—F. M. ROGERS. *Light Sussex.*

III. (**10s.**)—D. J. EVANS, *White Wyandotte.*

R.—PRESTON HALL POULTRY FARM.

H.C.—M. LINDNER, *White Orpington.*

CHICKENS OF 1923.

CLASS 51.—COCHIN, BRAHMA, PLYMOUTH ROCK, ORPINGTON, LANGSHAN, SUSSEX OR DORKING, COCKEREL. [10 entries.]

I. (**£1.**)—MAJOR J. A. MORRISON, D.S.O., *Sussex,* hatched January 3.

II. (**15s.**)—NORTHCOTT & SON, *Dark Dorking,* hatched January 28.

III. (**10s.**)—MAJOR J. A. MORRISON, D.S.O., *Rock,* hatched January 3.

R.—P. I. REES, *Light Sussex,* hatched January 15.

V.H.C.—P. I. REES, *Light Sussex,* hatched January 15.

H.C.—A. J. MAJOR, *Dorking,* hatched January 2.

CLASS 52.—COCHIN, BRAHMA, PLYMOUTH ROCK, ORPINGTON, LANSGHAN, SUSSEX OR DORKING, PULLET. [12 entries.]

I. (**£1.**)—A. J. FALKENSTEIN, *Sussex,* hatched January 9.

II. (**15s.**)—F. J. THOMAS, *White Rock,* hatched January 3.

III. (**10s.**)—JOHNS, BROS.

R.—A. J. MAJOR, *Dorking,* hatched January 2.

V.H.C.—H. N. HODGES, *Light Sussex,* January 2.

H.C.—C. H. BALMENT, *Dark Dorking,* hatched January 6.

CLASS 53.—MINORCA, WYANDOTTE, LEGHORN, HAMBURG, FAVEROLLES OR FRENCH, COCKEREL. [5 entries.]

I. (**£1.**)—PARK HOUSE POULTRY FARM, *White Wyandotte,* hatched January 6.

II. (**15s.**)—A. D. MITCHELL, *White Wyandotte,* hatched January 21.

R.—D. L. PRICE, *White Wyandotte,* hatched January 2.

CLASS 54.—MINORCA, WYANDOTTE, LEGHORN, HAMBURG, FAVEROLLES OR FRENCH, PULLET. [4 entries.]

I. (**£1.**)—PARK HOUSE POULTRY FARM, *White Wyandotte,* hatched January 6.

II. (**15s.**)—REV. R. L. COLLINS, *White Wyandotte,* hatched January 2.

R.—D. L. PRICE, *White Wyandotte,* hatched January 2.

CLASS 55.—GAME, MALAY, OR ANY DISTINCT BREED NOT PREVIOUSLY MENTIONED, COCKEREL. [4 entries.]

I. (**£1.**)—NORTHCOTT & SON, *Indian Game,* hatched January 14.

II. (**15s.**)—F. HOLT, *Indian Game,* hatched January 9.

CLASS 56.—GAME, MALAY, OR ANY OTHER DISTINCT BREED NOT PREVIOUSLY MENTIONED, PULLET. [5 entries.]

I. (£1.)—J. H. BAKER & SON, *Indian Game*, hatched January 2.

II. (15s.)—W. J. CAMP, *Indian Game.*

R.—NORTHCOTT & SON, *Indian Game*, hatched January 14.

LIVE TABLE POULTRY.

CLASS 57.—PAIR OF COCKERELS OF ANY PURE BREED, HATCHED IN 1923. [5 entries.]

I. (£1.)—J. H. BAKER & SONS, *Indian Game*, hatched January 2.

II. (15s.)—MAJOR J. A. MORRISON, D.S.O., hatched January 3.

R.—A. J. MAJOR, *Dorking*, hatched January 2.

H.C.—A. J. FALKENSTEIN, *Sussex*, hatched January 9.

CLASS 58.—PAIR OF PULLETS OF ANY PURE BREED, HATCHED IN 1923. [5 entries.]

I. (£1.)—A. J. FALKENSTEIN, *Sussex*, hatched January 9.

II. (15s.)—J. H. BAKER & SONS, *Indian Game*, hatched January 2.

R.—A. J. MAJOR, *Dorking*, hatched January 2.

H.C.—MAJOR J. A. MORRISON, D.S.O., hatched January 3.

CLASS 59.—PAIR OF CROSS-BRED COCKERELS, HATCHED IN 1923. [1 entry.]

I. (£1.)—MRS. A. HAMBLY, *Silver Wyandotte-Rhode Island Red*, hatched January 5.

CLASS 60.—PAIR OF CROSS-BRED PULLEFS, HATCHED IN 1923. [2 entries.]

I. (£1.)—MRS. A. HAMBLY, *Silver Wyandotte-Faverolle*, hatched January 5.

R.—MRS. A. HAMBLY, *Silver Wyandotte-Faverolle*, hatched January 5.

SPECIAL PRIZES.

Given by the Poultry Club.

Bath and West and Southern Counties Cup (value £10 10s.) For the best Bird in the Show, the property of a Member of the Poultry Club. The Cup to be won three times, not necessarily in succession, by the same exhibitor before becoming his absolute property.

I.—J. H. BAKER & SONS.

A Silver Medal for best Cock or Cockerel in the Poultry Classes, the property of a Member of the Poultry Club.

I.—J. H. BAKER & SONS.

A Silver Medal for the best Hen or Pullet in the Poultry Classes, the property of a Member of the Poultry Club.

I.—J. EDWARDS.

The Associated Society's Bronze Medal for the Best Bird in the Show. (Winner need not be a Member of the Poultry Club, but must be a Member of the Bath and West and Southern Counties Society).

I.—MAJOR J. A. MORRISON, D.S.O.

DUCKS, GEESE AND TURKEYS.

CLASS 61.—DRAKE OR DUCK (AYLESBURY). [7 entries.]

I. (£1.)—ABBOT BROS.

II. (15s.)—PARK HOUSE POULTRY FARM.

III. (10s.)—MRS. E. A. LLOYD.

R.—B. R. GIBBINS.

CLASS 62.—DRAKE OR DUCK (ROUEN). [2 entries.]

I. (£1.)—MAJOR J. A. MORRISON, D.S.O.

R.—ABBOT BROS.

CLASS 63.—DRAKE OR DUCK (INDIAN RUNNER). [6 entries.]

I. (£1.)—D. L. PRICE.

II. (15s.)—W. H. GRINDLAY.

III. (10s.)—PRESTON HALL POULTRY FARM.

CLASS 64.—DRAKE OR DUCK (ANY OTHER VARIETY). [7 entries.]

I. (£1.)—MAJOR J. A. MORRISON, D.S.O.

II. (15s.)—ABBOT BROS.

III. (10s.)—J. F. COONAN.

R.—J. NAGLE.

CLASS 65.—GANDER OR GOOSE. [4 entries.]

I. (£1.)—T. ABBOT.

II. (15s.)—MAJOR J. A. MORRISON, D.S.O.

R.—ABBOT BROS.

CLASS 66.—TURKEY, COCK OR HEN. [9 entries.]

I. (£1.)—T. ABBOT.

II. (15s.)—MISS P. O. HALLORAN.

III. (10s.)—J. F. COONAN.

R.—J. NAGLE.

V.H.C.—MAJOR J. A. MORRISON, D.S.O.

H.C.—MRS. A. GWYNNE HOWELL.

DEAD TABLE POULTRY.

CLASS 67.—PAIR OF COCKERELS OF 1923, OF ANY PURE BREED.

[3 entries.]

I. (£1.)—PARK HOUSE POULTRY FARM, *Light Sussex*, January 6.

II. (15s.)—MAJOR J. A. MORRISON, D.S.O., January 7.

R.—D. JOHN, *White Wyandottes*, January 18.

CLASS 68.—PAIR OF PUTLETS OF 1923, OF ANY PURE BREED.

[2 entries.]

I. (£1.)—PARK HOUSE POULTRY FARM, *Light Sussex*, January 6.

R.—MAJOR J. A. MORRISON, D.S.O., January 7.

CLASS 69.—PAIR OF CROSS-BRED COCKERELS OF 1923—FIRST PRIZE, £1—SECOND, 15s.—THIRD, 10s.

[NO ENTRY.]

CLASS 70.—PAIR OF CROSS-BRED PULLETS OF 1923. [2 entries.]

I. (£1.)—MRS. E. A. LLOYD, January 4.

R.—MRS. M. GRIFFITHS.

CLASS 71.—PAIR OF DUCKLINGS OF 1923. [1 entry.]

I. (£1.)—MRS. H. PAULL, February 15.

Bath and West and Southern Counties Society.

OBJECTS OF THE SOCIETY AND PRIVILEGES OF MEMBERSHIP.

ANNUAL EXHIBITIONS.

THE Society annually holds an Exhibition in some city or town in England or Wales. Each section of the Society's district is visited at intervals, so that most Members have an opportunity of seeing the Show in their own neighbourhood every few years. Prizes to a large amount are given for Horses, Cattle, Sheep, Pigs, Farm Produce, &c. Provision is also made for the exhibition of Agricultural Implements and Machinery, Seeds, Cattle Foods, Artificial Manures, and articles of general utility. A substantially built and completely equipped Working Dairy on a large scale is a special feature of these Exhibitions. Here explanatory demonstrations and comparative tests of implements and processes are carried on, with the assistance of well-known practical and scientific experts, and Butter-making Competitions are held. Among the features of the Annual Meeting are Shoeing, Milking and other Competitions, Poultry and Horticultural Shows, and Exhibitions illustrative of Bee-keeping, Home Industries, Manufactures, Nature Study and Forestry.

Membership entitles to free admission to the Annual Exhibition, and also to the Grand Stand overlooking the Horse and Cattle Ring, to the Reserved Seats in the Working Dairy, and to the use of the Members' Special Pavilion for Luncheons, Reading, Writing, &c.

Entries can be made by Members (elected on or before the last Tuesday in January preceding the Show, or who have paid two years subscription before the date of closing of entries), at about half the Fees payable by Non-Members.

THE JOURNAL.

All Members receive free of charge the Society's Journal, which is published annually bound in cloth. It has for its aim the dissemination of agricultural knowledge in a popular form, and, in addition to original articles by well-known agricultural authorities, it contains particulars of the Society's general operations, full reports of its experimental and research work, prize awards, financial statements, lists of Members, reviews of new books on agriculture, &c. (The price of the *Journal* to non-Members is 6s. 6d. post free.)

CHEMICAL AND OTHER FACILITIES.

The Society has a Consulting Chemist *from whom Members can obtain analyses and reports at reduced rates of charge.* An arrangement has also been made under which Members of the Society can obtain, free of charge, from the National Fruit and Cider Institute at Long Ashton, analyses of cider-apples and perry-pears, and, with a view to assisting farmers and others in dealing with insect and other pests which affect agriculture, horticulture, &c., the Council have availed themselves of an offer from the Board of Economic Biology of the University of Bristol to investigate the nature of any insect or other pest and report upon it free of charge.

EXPERIMENTS.

Experiments on crops are conducted at experimental stations in various parts of the Kingdom, and *Members are enabled to take part in these and to receive reports thereon.*

ART-MANUFACTURES, NATURE STUDY, FORESTRY, &c.

One of the objects for which the Society was founded was the encouragement of Arts as well as Agriculture, and, to this end, exhibitions are held of Art-Manufactures and of work representative of Arts and Handicrafts. Exhibitions are also held illustrating Nature Study, as a branch of Education; the Science of Forestry, &c.

TERMS OF MEMBERSHIP.

ANNUAL SUBSCRIPTIONS.

Governors, not less than	£2
Ordinary Members, not less than	£1
Tenant Farmers, the rateable value of whose holdings does not exceed £200 a-year, not less than	10s.

Governors, who are eligible for election as President or Vice-President, are entitled, in addition to the privileges already mentioned, to an extra Season Ticket for the Annual Exhibition and for the Grand Stand, &c. Governors subscribing more than £2 are entitled to a further Ticket for every additional £1 subscribed.

Members subscribing less than £1 are entitled to all the privileges of Membership except that of entering Stock at reduced fees, and their admission Ticket for the Annual Show is available for *one day only* instead of for the whole time of the Exhibition.

LIFE COMPOSITIONS.

Governors may compound for their Subscription for future years by payment, in advance, of £20; and Members by payment, in advance, of £10. Governors and Members who have subscribed for twenty years may become Life Members on payment of half these amounts.

Any person desirous of joining the Society can be proposed by a Member, or by the Secretary, 3, Pierrepont Street, Bath.

Telegraphic Address—"Agriculture, Bath."

Telephone No. 610.

Bath and West and Southern Counties Society.

GENERAL LAWS.

As revised in accordance with the Report of a Special Committee; which Report was received and adopted by the Annual General Meeting of Members, held on May 19, 1923.

COMPOSITION OF THE SOCIETY.

I. The Society shall consist of a President, Vice-Presidents, Trustees, Council, Treasurer, Secretary, and Members.

OBJECTS.

II. The Society shall have the following objects:—

(*a*) To hold Exhibitions of breeding stock, agricultural implements, and such other articles connected with agriculture, horticulture, arts, manufactures or commerce, as may be determined upon by the Council.

(*b*) To conduct practical and scientific investigations in agriculture and horticulture.

(*c*) To promote technical education in agriculture and horticulture by providing means of systematic instruction.

(*d*) To publish a Journal for circulation.

SUBSCRIPTIONS.

III. The Annual Subscription for Members shall be as follows —

Governors (who are eligible for election as President or Vice-President), not less than	£2
Ordinary Members, not less than	£1
Tenant Farmers (the rateable value of whose holdings does not exceed £200 a year), not less than	10s.

IV. The payment of £20 in one sum shall constitute a Governor for life, and of £10 in one sum an Ordinary Member for life; but any Governor who has subscribed not less than £2 annually for a period of twenty years may become a Life Governor on the further payment of £10 in one sum; and any Ordinary Member, who has subscribed not less than £1 annually for the same period may become a Life-Member on the further payment of £5 in one sum.

V. Subscriptions shall become due and be payable in advance on the 1st of January in each year or as soon as the Subscriber has been elected a Member. When the election takes place during the last quarter of the year the subscription payable on election will be considered as applying to the ensuing year.

VI. A Member shall be liable to pay his subscription for the current year unless he shall have given notice, in writing, to the Secretary before January 1st of his intention to withdraw.

GOVERNING BODY.

VII. The entire management of the Society—including the making of Bye-laws, election of Members, determining the Prizes to be awarded, appointing Committees, fixing the Places of Meetings and Exhibitions, appointing or removing the Treasurer, Secretary, and such other officers as may be required to carry on the business of the Society—shall be vested in the Council who shall report its proceedings at the Annual Meetings of the Society.

VIII. The Council shall consist of the Patron (if any), President, Vice-Presidents, Trustees, and Treasurer (who shall be *ex-officio* Members), and of sixty-six elected Members.

ELECTION OF PRESIDENT, VICE-PRESIDENTS, TRUSTEES AND COUNCIL.

IX. The election of a President for the year, of any additional Vice-Presidents or Trustees, and of the Members of Council representing the Divisions named in Law X., shall take place at the Annual Meeting of the Society, and they shall enter into office at the conclusion of the Exhibition during which such Annual Meeting has been held.

X. The sixty-six Members of the Council referred to in Laws VIII. and IX. shall consist of fifty-eight persons residing or representing property in the following Divisions, viz. :—

Twelve from the Counties of Devon and Cornwall, which shall be called the Western Division ;

Twenty-four from the Counties of Somerset, Dorset and Wilts, which shall be called the Central Division ;

Twelve from the Counties of Hants, Berks, Oxon, Bucks, Middlesex, Surrey, Sussex and Kent, which shall be called the Southern Division ; and

Ten from the Counties of Worcester, Gloucester, Hereford and Monmouth, and the Principality of Wales, which shall be called the North-Western Division.

The remaining eight shall be elected (irrespective of locality) from the general body of members, and shall form a Division which shall be called the "Without Reference to District" Division.

XI. One-half of the elected Members in each of the five Divisions named in Law X. shall retire annually by rotation, but shall be eligible for re-election.

XII. The Council shall have power to nominate a President, Vice-Presidents, Trustees, and Members of Council for the approval of the Annual Meeting, and to fill up such vacancies in their own body as are left after the Annual Meeting, or as may from time to time occur during the interval between the Annual Meetings.

XIII. Nominations to offices, election to which is vested in the whole body of Members, must reach the Secretary ten days before the meeting at which such vacancies are to be filled up.

MEETINGS.

XIV. The Annual Meeting of the Society shall take place during the holding of the annual Exhibition.

XV. Special General Meetings of the Society may be convened by the President on the written requisition of not less than three Members of Council; and all Members shall have ten days' notice of the object for which they are called together,

XVI. No Member of less than three months' standing, or whose subscription is in arrear, shall be entitled to vote at a Meeting.

EXHIBITIONS.

XVII. The Annual Exhibitions of the Society shall be held in different Cities or Towns in successive years.

XVIII. All Exhibitors shall pay such fees as may be fixed by the Council. Members subscribing not less than £1 per annum, who have been elected previous to February 1st, and have paid the subscription for the current year, or if elected later, who pay a subscription for the previous year and the current subscription before the date of closing of entries, shall be entitled to exhibit at such reduction in these fees as the Council shall determine.

PRIZES.

XIX. All prizes offered at the cost of the Society shall be open for competition to the United Kingdom.

XX. No person intending to compete for any prize offered at the annual Exhibition shall be eligible to act as a judge or to have any voice in the selection of judges to award the premiums in the department in which he exhibits.

XXI. If it be proved to the satisfaction of the Council that any person has attempted to gain a prize in this, or in any other society, by a false certificate or by a misrepresentation of any kind, such person shall thereupon be, for the future excluded from exhibiting in this Society.

JOURNAL.

XXII. The Proceedings of the Society, Awards of Prizes, Financial Statements and Lists of Officers, Governors, and Members, shall be printed annually in the Society's *Journal*, and every Governor and Member, not in arrear with his subscription, shall be entitled to receive one copy, free of expense, and there shall be an additional number printed for sale.

POLITICS.

XXIII.—No motion or question of a political tendency shall be introduced at any meeting of the Society, otherwise than with the consent of two-thirds of the members present at any meeting, and then only after 14 days notice in writing.

ALTERATIONS IN LAWS.

XXIV. No new General Law shall be made or existing one altered, added to or rescinded, except at an Annual or Special General Meeting, and then only provided that a statement of particulars, in writing, shall have been sent to the Secretary at least twenty-one days previous to the Meeting at which the question is to be considered.

LIST OF OFFICERS,

1923-24.

PATRON.

HIS MOST GRACIOUS MAJESTY THE KING.

PRESIDENT.

Lt.-Col. Sir DENNIS F. BOLES, Bart., C.B.E., D.L.

TRUSTEES.

*Bath, The Marquis of, K.G., Longleat, Warminster.
Edwards, C. L. F., The Court, Axbridge. Somerset.
Shelley, Sir. J., Bart., Shobrooke Park, Crediton.

VICE-PRESIDENTS.

Ashcroft, W.	The Waldrons, Croydon
Badcock, H. J.	Broadlands, Taunton
Baker, G. E. Lloyd	Hardwicke Court, Gloucester
*Bath, Marquis of, K.G.	Longleat, Warminster
*Beaufort, Duke of	Badminton, Chippenham
Benyon, J. Herbert	Englefield House, Reading
*Bledisloe, Lord, K.B.E.	Lydney Park, Gloucester
Blythswood, Lord	Penrice Castle, Reynoldston, S.O., Glam.
*Bute, Marquis of	The Castle, Cardiff
*Clinton, Lord	Heanton Satchville, Dolton, N. Devon
*Coventry, The Earl of	Croome Court, Worcester
Edwards, C. L. F.	The Court, Axbridge, Somerset
Falmouth, Viscount	Tregothnan. Truro
Hambleden, Viscount	Greenlands, Henley-on-Thmes
Hobhouse, Right Hon. H.	Hadspen House, Castle Caary
*Lansdowne, Marquis of, K.G.	Bowood, Calne
*Llewelyn, Sir J. T. D., Bart.	Penllergaer, Swansea
Mount Edgcumbe, The Earl of	Mount Edgcumbe, Devonport
Napier, H. B.	Long Ashton, Bristol

⁂ Those to whose names an asterisk (*) is prefixed have filled the office of President.

VICE-PRESIDENTS—*continued.*

Neville Grenville, R.	Butleigh Court, Glastonbury
Northumberland, Duke of	Albury Park, Guildford
Poltimore, Lord	Court Hall, North Molton, Devon
Radnor, The Earl of	Longford Castle, Salisbury
Shelley, Sir J., Bart.	Shobrooke Park, Crediton
Strachie, Lord	Sutton Court, Pensford, Somerset
Temple, Earl	Newton St. Loe, Bristol

The Lord Warden of the Stannaries.

The Secretary and Keeper of the Records of the Duchy of Cornwall.

The Receiver-General of the Duchy of Cornwall.

⁂ Those to whose names an asterisk (*) is prefixed have filled the office of President.

MEMBERS OF COUNCIL.

EX-OFFICIO MEMBERS.

The Patron.
The President.
The Vice-Presidents.
The Trustees.
The Treasurer.

ELECTED MEMBERS.

WESTERN DIVISION (Devon and Cornwall).

(12 *Representatives*)

Elected in 1923.

Name.	*Address.*
BUCKINGHAM, REV. PREB.	The Rectory, Doddiscombsleigh, Exeter
GIBBS, A. H.	Pytte, Clyst St George, Topsham, Devon
MOORE-STEVENS, COL. R. A.	Woodhayes, Whimple, Devon
SHELLEY, J. F.	Posbury House, Crediton
STUDDY, T. E.	Broxton, Paignton
WILLIAMS, JOHN	Scorrier House, Scorrier, Cornwall

Elected in 1922.

Name.	*Address.*
BOSCAWEN, REV. A. T.	Ludgvan Rectory, Long Rock R.S.O., Cornwall
CHICHESTER, MAJOR C. H.	Hall, Bishop's Tawton, Barnstaple
DAW, J. E.	4, Louisa Terrace, Exmouth
LOPES, SIR HENRY Y. B., Bart.	Maristow, Roborough, South Devon
MARTYN, G.	Liskeard, Cornwall
MORLEY, EARL OF	Saltram, Plympton, Devon

CENTRAL DIVISION (Somerset, Dorset, and Wilts).

(24 *Representatives.*)

BEAUCHAMP, SIR F. B.	Woodboro' House, Peasedown St. John, Bath
BRUFORD, R.	Nerrols, Taunton
CLIVE, CAPT. E. A. B.	South Brympton, Yeovil
FOX, R. A.	Yate House, Yate, Glos.
GIBSON, J. T.	Warren House, Wrington
LIPSCOMB, G.	Claveton Lodge, Bathwick Hill, Bath
MILES, SIR C., Bart.	Manor House, Walton-in-Gordano, Clevedon.
NICHOLS, G.	Demerara House, Colston Avenue, Bristol
PEARCE, T. H.	Parsonage Farm, Long Ashton, Bristol
SANDERS, THE RIGHT HON. LIEUT.-COL. SIR R.A., Bart.	Bayford Lodge, Wincanton
TUDWAY, C. C.	The Cedars, Wells, Somt.
WYNFORD, LIEUT.-COL. LORD, D.S.O.	Wynford House, Maiden Newton, Dorset

FARWELL, Major E. W.	Hylton Estate Office, Kilmersdon, Bath
GORDON, G. H.	The Barn House, Sherborne, Dorset
HILL, MAJOR V. T.	Woodspring Priory, near Weston-super-Mare
HOARE, SIR H. H. A., Bart.	Stourhead, Zeals, S.O., Wilts
HURLE, J. C.	Kilve Court, Bridgwater
KNIGHT, S. J.	Buckingham Lodge, Keynsham, Bristol
POPHAM, H. L.	Hunstrete House, Pensford, Bristol
RAWLENCE, E. A.	St. Andrew's, Salisbury
RAWLENCE, G. N.	Salisbury
SOMERVILLE, A. F.	Dinder House, Wells
WATSON, CAPT. THE HON. T. H.	Cormiston, Milverton, Somerset
WHITE, A R., O.B.E.	Charnage, Mere, Wilts

SOUTHERN DIVISION (Hants, Berks, Oxon, Bucks, Middlesex, Surrey, Sussex and Kent).

(12 *Representatives.*)

ACLAND, Rt. HON. F. DYKE, M.P.	93, Bedford Gardens, Campden Hill, London, W. 8
BATHURST, SIR F. H., Bart., D.S.O.	Somborne Park, Stockbridge, Hants
FOLKESTONE, VISCT.	Longford Castle, Salisbury
JERVOISE, F. H. T.	Herriard Park, Basingstoke
SUTTON, E. P. F.	Sidmouth Grange, Earley, Berks
THOMAS-STANFORD, C.	Preston Manor, Brighton

COBB, H. M.	Higham, Rochester
CUNDALL, H.M., I.S.O., F.S.A.	4, Marchmont Gardens, Richmond Hill, Surrey
DRUMMOND, Brig.-Gen. H. W.	Board Room, L.&S.W.R., Waterloo Stn., London
ISMAY, J. H	Iwerne Minster, Blandford
LLEWELLYN, CAPTAIN L. T. E.	Hackwood, Basingstoke
ORDE POWLETT HON. N.A.	Bolton Hall, Leyburn, Yorkshire

NORTH-WESTERN DIVISION (Worcestershire, Gloucestershire, Herefordshire, Monmouthshire and Wales).

(10 *Representatives.*)

ALLSEBROOK, A.	Frenches, Mark Cross, Sussex
BEST, CAPT. W.	Vivod, Llangollen
MASTERS, A.	Kyneton, Thornbury, Gloucester
MASON, F. F.	Swansea
STORRAR, J. I.	Tredegar Estate Office, Newport, Mon.

ACKERS, C. P.	Huntley Manor, Glos.
ALEXANDER, Hubert.	5, High Street, Cardiff
DRUMMOND, COL. F. D. W., C.B.E.	Cawdor Estate Office, Carmarthen
EVANS, H. M. G.	Plasissa. Llangennech, Carmarthen
LEWIS, COL. H.	Green Meadow, nr. Cardiff

WITHOUT REFERENCE TO DISTRICT DIVISION.

(8 *Representatives.*)

BEST, MAJOR T. G.	East Carleton Manor, Norwich
CORNWALLIS, Col. F.S.W.	Linton Park, Maidstone
PASS, MAJOR A. D.,	Manor House, Wootton Fitzpaine, Charmouth, Dorset

HOBHOUSE, A. L., M.P.	Hadspen House, Castle Cary, Somerset
SHAW, COL. F. S. KENNEDY	Teffont Magna, Salisbury
SWANSEA, LORD, D.S.O. M.V.O.	Glanogwr, Bridgend, Glam.

STANDING COMMITTEES, 1923-1924

[The President is an *ex-officio* Member of all Committees.]

ALLOTMENT.

Chairman.

Bath, Marquis of, K.G.
Bathurst, Sir F. H., Bart., D.S.O.
Best, Capt. W.
Folkestone, Viscount
Mason, F. F.
Napier, H. B
Shelley, J F
Studdy, T. E
Wynford, Lieut. Col. Lord, D.S.O.

CONTRACTS.

Napier, H. B., *Chairman.*

Allsebrook, A.
Bath. Marquis of, K.G.
Bathurst, Sir F. H., Bart , D.S.O.
Best, Capt. W.
Daw, J. E.
Mason, F. F.
Neville Grenville, R.
Rawlence, G. N.
Studdy, T. E.

DAIRY.

Somerville, A. F., *Chairman.*

Ashcroft. W.
Clive, Captain E. A. B.
Gibbs, A. H.
Gibson, J. T.
Hurle, J. C.
Knight, S. J.
Llewellyn, L. T. E.
Napier, H. B.
Neville Grenville, R.
Strachie, Lord
Tudway, C. C.
Voelcker, Dr J. A. M.A.
White, A. R., O.B.E.

DISQUALIFYING.

The Stewards of Live Stock and Produce.

EXPERIMENTS AND EDUCATION.

Lord Bledisloe, K.B.E., *Chairman.*

Ackers. C. P.
Allsebrook, A.
Ashcroft, W.
Baker. G. E. Lloyd
Benyon, J. H.
Gibson, J. T.
Hobhouse, A. L., M.P.
Hurle. J. C.
Ismay, J. H.
Lipscomb, G.
Napier, H. B.
Neville Grenville, R.
Penberthy, Prof. J., F.R.C.V.S.
Rawlence, E. A.
Somerville, A. F.
Sutton, E. P. F.
Voelcker, Dr. J. A., M.A.
Wallace Capt. T. M.Sc., M.C.

(With power to add to their number.)

FINANCE.

Napier, H. B., *Chairman.*

Daw, J. E.
Gibbs, A. H.

FORESTRY.

Lipscomb, G., *Chairman.*

Ackers, C. P.
Bledisloe, Lord, K.B.E.
Clinton, Lord
Drummond Col. F. D. W., C.B.E.
Duchesne, M. C.
Evans, H. M. G.
Hoare, Sir H. H. A., Bart.
Napier, H. B.
Orde Powlett, Hon. N. A.

IMPLEMENT REGULATIONS.

Bath, Marquis of, K.G., *Chairman.*

Bathurst, Sir F. H., Bart., D.S.O.
Best, Capt. W.
Martyn, G.
Mason, F. F.
Moore-Stevens, Col. R. A.
Napier, H. B.
Neville Grenville, R.
Studdy, T. E.

JOURNAL.

Edwards, C. L. F., *Chairman.*

Acland, Rt. Hon. F. D., M.P.
Baker, G. E. Lloyd
Bledisloe, Lord, K.B.E.
Hurle, J. C.

JUDGES' SELECTION.

Wynford, Lieut.-Col. Lord, D.S.O., *Chairman.*

Alexander, Hubert
Bathurst, Sir F. H., Bart D.S.O.
Gordon, G.
Hoare, Sir H.H.A.,Bart.
Mason, F. F.
Moore-Stevens, Col. R. A.
Napier, H. B.
Shaw, Col. F. S. Kennedy
Shelley J. F.

RAILWAY ARRANGEMENTS AND ADVERTISEMENTS.

Bath, Marquis of. K.G.
Bledisloe, Lord, K.B.E
Coventry, Earl of
Drummond, Brig.-Gen. H. W.
Mason, F. F.

(With power to add to their number.)

SCIENCE AND ART.

Bath, Marquis of, K.G., *Chairman.*

Acland, Rt. Hon., F. D., M.P.
Bledisloe, Lord, K.B.E.
Cundall, H. M. (I.S.O., F.S.A.)
Daw, J. E.
Evans, H. M. G.
Farwell, Major E. W
Hobhouse, Rt. Hon. H.
Lipscomb, G.
Llewelyn, Sir J. T. D., Bart.
Napier, H. B.

(With power to add to their number.)

SELECTION.

The Chairmen of all other Committees.

SHOW PLACE AND DATE.

Chairman of the Allotment, Contracts, Dairy, Finance, Forestry, Implement Regulations, Railway Arrangements, Science and Art, and Stock Prize Sheet Committees.
(With power to add two Local Members to their number.)

STOCK PRIZE SHEET.

Wynford, Lieut.-Col. Lord, D.S.O., *Chairman.*

Alexander, Hubert
Allsebrook, A.
Buckingham, Rev. Preb.
Chichester Major C. H.
Evans, H. M. G.
Gibbs, A. H.
Hoare, Sir H. H. A., Bart.
Lewis, Col. H.
Mason, F. F.
Miles, Lieut.-Col. Sir C., Bart.
Moore-Stevens, Col. R. A.
Shaw, Col. F. S. Kennedy
Shelley, J. F.
Storrar. J. I
Sutton, E. P. F
White, A. R., O.B.E.

WORKS.

Chairman.

BATH, MARQUIS OF, K.G.
BATHURST, SIR F. H., Bart. D.S.O.
BEST, CAPT. W.
MASON, F. F.
NAPIER, H. B.
STUDDY, T. E.

Stewards.

Cattle, Sheep and Pigs.
MOORE-STEVENS, COL. R. A.
MILES, LIEUT.-COL. SIR C., Bart.
SHELLEY, J. F.

Cider.
FARWELL, MAJOR E. W.

Dairy.
SOMERVILLE, A. F.
GIBBS, A. H.

Experiments.
ACKERS, C. P.

Finance.
NAPIER, H. B.
DAW, J. E. GIBBS, A. H.

Forage.

Forestry.
LIPSCOMB, G.

Horses.
WYNFORD, LIEUT.-COL. LORD., D.S.O.
HOARE, SIR H. H. A., Bart.
ALEXANDER, HUBERT

Horticulture.
TUDWAY, C. C.

Music.
CUNDALL, H. M. (I.S.O., F.S.A.)

Poultry.
STUDDY, T. E.

Science and Art.
CUNDALL, H. M. (I.S.O., F.S.A.)
EVANS, H. M. G.

Shoeing.
MASON, F. F.

Yard.
BATH, MARQUIS OF, K.G.
BATHURST, SIR F. H., Bart., D.S.O.
BEST, CAPT. W.
STUDDY, T. E.

Society's Representatives on Governing Bodies and Committees.

Royal Agricultural College, Cirencester—PENBERTHY, Prof. J. (F.R.C.V.S.)
Dauntsey School Foundation—WHITE, A. R., O.B.E.
National Fruit and Cider Institute—NAPIER, H. B., ACKERS, C. P.
Sugar Beet Growers Society—ALEXANDER, HUBERT.
South Eastern Agricultural College, Wye—ASHCROFT, W.
Dairy Research Committee of University College, Reading—LATHAM, T.
Agricultural Education Committee of Wilts County Council—WHITE, A. R., O.B.E.

Permanent Officials.

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Secretary and Editor—STORR, F. H., O.B.E.
Assistant Secretary—SMITH, W. A.

Auditor.
GOODMAN, F. C. (*Chartered Accountant*)

Consulting Chemist.
VOELCKER, DR. J. A. (M.A., F.I.C.)

Veterinary Inspector.
PENBERTHY, Prof. J. (F.R.C.V.S.)

Superintendent of Works.
AYRE, H. C.

Annual Exhibitions.

Year.	Place Visited.	Local Subscription.	Prizes.			Total Local Contribution.	President.	Admissions.		
			Local Committee.	Local Societies	Local Residents.			On 2/6 Days.	On 1/- Days.	Total.
		£	£	£	£	£				
1852	Taunton	210	..	..	..	210	Lord Portman	..	..	..
1853	Plymouth	450	..	..	..	450	Sir T. D. Acland, Bart.	..	..	..
1854	Bath	450	..	..	..	450	William Miles, M.P.	..	..	..
1855	Tiverton	450	..	..	..	450	Earl Fortescue	..	..	..
1856	Yeovil	450	..	..	..	450	C. A. Moody, M.P.	..	..	..
1857	Newton Abbot	700	..	..	..	700	Lord Courtenay	..	..	..
1858	Cardiff	800	..	..	..	800	Lord Courtenay	..	..	..
1859	Barnstaple	800	85	..	81	966	John Sillifant	..	..	..
1860	Dorchester	900	..	..	..	900	Lord Rivers	10,709	11,949	22,658
1861	Truro	900	..	..	..	900	J. W. Buller, M.P.	15,201	14.220	29.421
1862	Wells	900	..	..	..	900	Sir T. D. Acland, Bart.	10,578	4,775	15,353
1863	Exeter	900	..	..	..	900	Marquis of Bath	15,635	19,284	34,919
1864	Bristol	1000	106	..	50	1156	Earl Fortescue	22.377	65,678	88,055
1865	Hereford	900	358	..	..	1258	Lord Taunton	16.575	35 261	51.836
1866	Salisbury	900	57	..	..	957	Earl of Portsmouth	7.288	18,737	26,025
1867	Salisbury	..					J. Tremayne	7.502	16,702	24.204
1868	Falmouth	900	..	..	..	900	Sir J. T. B. Duckworth, Bart.	11,393	19,495	30,888
1869	Southampton	900	132	..	18	1050	Earl of Carnarvon	15.340	41,290	56,630
1870	Taunton	900	..	..	..	900	Sir S. H. Northcote, Bart., C.B., M.P.	17.952	33.653	51,605
1871	Guildford	900	110	..	..	1010	Earl of Cork	10.656	23,406	34,062
1872	Dorchester	800	..	..	10	810	Duke of Marlborough, K.G.	12,791	21.517	34,308
1873	Plymouth	800	..	400	..	1200	Earl of Mount-Edgcumbe	16,665	45,744	62,409
1874	Bristol	800	403	..	..	1203	Sir Massey Lopes, Bart., M.P.	37,329	72,791	110.120
1875	Croydon	800	245	..	..	1045	R Benyon, M.P.	14.518	26.028	40,546
1876	Hereford	800	381	..	..	1181	Earl of Ducie	16.396	32.645	49,041
1877	Bath	800	215	..	..	1015	Marquis of Lansdowne	27,625	48,852	76,477
1878	Oxford	800	..	170	6	976	Earl of Jersey	12,414	26.995	39.409

ANNUAL EXHIBITIONS—*continued.*

Year.	Place Visited.	Local Subscription.	Prizes.			Total Local Contribution.	President	Admissions.			
			Local Committee.	Local Societies	Local Residents.			On 5/- Day.	On 2/6 Days.	On 1/- Days.	Total.
		£	£	£	£	£					
1879	Exeter . .	800	..	..	10	810	Earl of Morley . .	..	14,634	40,533	55,167
1880	Worcester .	800	..	254	..	1054	Earl of Coventry . . .	..	8,415	37,675	46,090
1881	Tunbridge Wells	800	245	34	..	1079	Marquis of Abergavenny. .	..	13,368	33,236	46,604
1882	Cardiff . .	800	200	198	17	1215	Lord Tredegar . . .	..	23,941	38,680	62.621
1883	Bridgwater	800	78	..	..	878	Lord Brooke, M P. . . .	..	17,171	31,241	48,412
1884	Maidstone .	800	310	33	75	1218	Viscount Holmesdale . .	..	13,501	31,053	44,554
1885	Brighton .	800	227	33	82	1142	Viscount Hampden . .	..	9,637	39,851	49.488
1886	Bristol . .	800	525	..	..	1325	Lord Carlingford . . .	..	29,580	70,999	100,579
1887	Dorchester .	800	..	112	..	912	Earl of Ilchester . . .	..	8,860	29,846	38,706
1888	Newport (Mon.)	800	100	..	..	900	Lord Tredegar . . .	..	14,878	38,567	53,445
1889	Exeter . .	800	..	..	10	810	Lord Clinton	..	16,405	36,195	52,600
1890	Rochester .	800	294	..	26	1120	Earl of Darnley . . .	..	3,480	48,314	51,794
1891	Bath . .	800	50	103	100	1053	Earl Temple	..	23,510	52,185	75,695
1892	Swansea . .	800	200	100	10	1110	Sir J. D. T. Llewelyn, Bart. .	..	18,364	54,609	72,973
1893	Gloucester .	800	400	..	..	1200	Lord Fitzhardinge . . .	..	14,272	40,368	54,640
1894	Guildford .	800	174	..	10	984	Earl of Onslow . . .	..	8,671	29,813	38,484
1895	Taunton . .	800	85	160	10	1055	Viscount Portman . . .	..	13,181	30,111	43,292
1896	St. Albans . .	800	152	..	..	952	Earl of Clarendon . . .	..	12,056	22,380	34,436
1897	Southampton .	800	50	..	..	850	Lord Montagu of Beaulieu .	..	8,284	33,750	42,034
1898	Cardiff . .	800	200	..	..	1000	Lord Windsor	..	13,101	42,501	55,602
1899	Exeter . .	800	..	225	5	1030	Lord Clinton	..	16,091	39,832	55,923
1900	Bath . .	800	100	150	10	1060	Marquis of Bath . . .	954	11,601	36,814	49,369
1901	Croydon . .	800	115	..	..	915	H.R.H. The Duke of Cornwall and York, K.G. - .	1,196	9,362	30,693	41,251
1902	Plymouth .	800	105	100	36	1041	Earl of Morley . . .	842	12,629	40,565	54,036
1903	Bristol . .	800	434	50	61	1345	Duke of Beaufort . . .	..	34,528	74,352	108,880
1904	Swansea . .	800	350	..	..	1150	Lord Windsor . . .	..	28,265	50,562	78,827

Annual Exhibitions—*continued.*

Year.	Place Visited.	Local Subscription.	Prizes.			Total Local Contribution.	President.	Admissions.				
			Local Committee.	Local Societies.	Local Residents.			On 5/- Day.	On 2/6 Days.	On 3/- Days.	On 1/- Days.	Total.
		£	£	£	£	£						
1905	Nottingham	800	..	218	..	1018	Duke of Portland, K.G.	..	8,913		45,964	54,877
1906	Swindon	800	..	200	50	1050	Earl of Radnor	..	7,838		42,013	49,851
1907	Newport (Mon.)	800	201	51	29	1081	H.R.H. The Prince of Wales, K.G	..	16,236		37,819	54,055
1908	Dorchester	800	100	25	..	925	Lord Digby	..	12,227		20,350	32,577
1909	Exeter	800	..	100	..	900	Lord Clinton	..	14,898		41,891	56,789
1910	Rochester and Chatham	800	117	..	..	917	Earl of Darnley	..	5,892		20,105	25,997
1911	Cardiff	800	195	110	10	1115	Marquis of Bute	..	16,213		40,588	56,801
1912	Bath	800	100	100	..	1000	Marquis of Bath	..	13,843		40,935	54,788
1913	Truro	800	35	115	39	918	Viscount Falmouth	..	12,918		44,700	57,618
1914	Swansea	800	301	..	..	1101	Sir J. T. D. Llewelyn, Bart.	..	17,957		67.805	85,762
1915	Worcester	400	..	257	..	657	The Earl of Coventry	..	7,760		28.013	35,773
1916 to 1919	No Shows						The Earl of Coventry					
									4/-		2/-	
1920	Salisbury	800	24	105	131	1060	The Earl of Radnor	..	19,392		25,255	44,647
1921	Bristol	800	1000	354	..	2154	The Lord Bledisloe, K.B.E.	5105	36,068		58,473	99,646
1922	Plymouth	800	132	281		1213	H.R.H. The Prince of Wales, K.G.	4124	19,289	20,558	34 856	58,269
1923	Swansea	800	295		200	1295	H.R.H. The Prince of Wales, K.G.	4344	12,286		78,162	115,345
1924	Taunton						Sir Dennis F. Boles, Bart.					

Members' Privileges.

ANALYSES OF FERTILISERS, FEEDING STUFFS, WATERS, SOILS, &c.

Applicable only to the case of Persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis).

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested in applying for Analyses, to state that they do so as Members of the first-named Society.

THE following are the rates of Charges for Chemical Analyses to Members of the Society.

Those privileges are applicable only when the analyses are for *bona-fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The analyses are given on the understanding that they are required for the individual and sole benefit of the Member applying for them, and must not be used for other persons, or for commercial purposes.

Land or estate agents, bailiffs, and others, when forwarding samples are required to state the names of those Members on whose behalf they apply

Members are also allowed to send for analysis under these privileges any manures or feeding-stuffs to be used by their outgoing tenants, or which are to be given free of cost to their occupying tenants.

The analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

Members are requested, when applying for an analysis, to quote the number in the subjoined schedule under which they wish it to be made.

No.		
1.	—An opinion of the purity of bone-dust or oil-cake (each sample)	2*s.* 6*d.*
2.	—An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged	5*s.*
3.	—An analysis of guano, showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
4.	—An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged	5*s.*
5.	—An analysis of superphosphate of lime, dissolved bones, etc., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime and ammonia, together with an opinion as to whether it be worth the price charged	10*s.*
6.	—An analysis of bone-dust, basic slag, or any other ordinary artificial manure together with an opinion as to whether it be worth the price charged	10*s.*
7.	—An analysis of compound artificial manures, animal products, refuse substances used for manure, etc.	from 10*s.* to £1
8.	—An analysis of limestone, showing the proportion of lime	7*s.* 6*d.*
9.	—An analysis of limestone, showing the proportion of lime and magnesia	10*s.*
10.	—An analysis of limestone or marls, showing the proportion of carbonate, phosphate, and sulphate of lime and magnesia, with sand and clay	10*s.*
11.	—Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime	£1
12.	—Complete analysis of a soil	£3
13.	—An analysis of oil-cake or other substance used for feeding purposes, showing the proportion of moisture, oil, mineral matter, albuminous matter, and woody fibre as well as of starch, gum, and sugar in the aggregate ; and an opinion of its feeding and fattening or milk-producing properties	10*s.*
14.	—Analysis of any vegetable product	10*s.*
15.	—Determination of the " hardness " of a sample of water before and after boiling	5*s.*
16.	—Analysis of water of land-drainage, and of water used for irrigation	£1
17.	—Analysis of water used for domestic purposes	£1 10*s.*
18.	—An analysis of milk (to assist Members in the management of their Dairies and Herds, *bona-fide* for their own information and not for trade purposes, nor for use in connection with the Sale of Food and Drugs Acts)	5*s.*
19.	—Personal consultation with the Consulting Chemist. (To prevent disappointment it is suggested that Members desiring to hold a consultation with the Consulting Chemist should write to make an appointment)	5*s.*
20.	—Consultation by letter	5*s.*
21.	—Consultation necessitating the writing of three or more letters	10*s.*

Members wishing to exercise their privileges on the above-named terms, should forward their samples for examination *by post or parcel prepaid*, to the Consulting Chemist, DR. JOHN AUGUSTUS VOELCKER, M.A., F.I.C., Stuart House, 1, Tudor Street, London. E.C.

The fees for analysis must be sent to the Consulting Chemist at the time of application

GUIDE TO PURCHASERS OF FERTILISERS AND FEEDING STUFFS.

Purchasers are recommended in every case to insist upon having an *Invoice* given to them. This invoice should set out clearly :—

In the case of **Fertilisers**—
  (1) The **name** of the fertiliser ;
  (2) Whether the fertiliser be artificially **compounded** or not ;
  (3) The **analysis** guaranteed in respect of the principal fertilising ingredients.
In the case of **Feeding-Stuffs**—
  (1) The **name** of the article ;
  (2) The **description** of the article : whether it has been made from one substance or seed only, or from more than one ;
  (3) The **analysis** guaranteed in respect of Oil and Albuminoids.

(NOTE.—The use of terms "Linseed-cake," "Cotton-cake," etc., implies that these cakes shall be "pure" and purchasers are recommended to insist upon these terms being used without any qualification such as "95 per cent.," "as imported," etc. "Oil cake" should be avoided.

Members of the Society should see that the **Invoices** agree accurately with the orders given by them, and, in giving these orders, they should stipulate that the goods come up to the guarantees set out in the following list, and that they be sold **subject to the analysis and report of the Consulting Chemist of the Bath and West and Southern Counties Society.**

FERTILISERS.

Raw Bones, Bone-meal, or **Bone-dust** to be guaranteed "PURE," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. of Ammonia.

Steamed or "Degelatinised" Bones to be guaranteed "PURE," and to contain not less than 55 per cent. of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

Mineral Superphosphate of Lime to be guaranteed to contain a certain per centage of "Soluble Phosphate." [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

Dissolved Bones to be guaranteed to be "made from raw bone and acid only." and to be sold as containing stated percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia

Compound Artificial Manures, Bone Manures, Bone Compounds, etc., to be sold by analysis stating the percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

Basic Slag to be guaranteed to contain a certain percentage of Phosphoric Acid, and to be sufficiently finely ground that 80 to 90 per cent. passes through a sieve having 10,000 meshes to the square inch.

Peruvian Guano to be described by that name, and to be sold by analysis stating the percentages of Phosphates and Ammonia.

Sulphate of Ammonia to be guaranteed to be "PURE," and to contain not less than 24 per cent. of Ammonia.

Nitrate of Soda to be guaranteed to be "PURE," and to contain 95 per cent. of Nitrate of Soda.

Kainit to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All fertilisers to be delivered in good and suitable condition for sowing.

FEEDING-STUFFS.

Linseed Cake, Cotton Cake (Decorticated and Undecorticated), and **Rape Cake** (for feeding purposes) to be pure, i.e., prepared *only* from one kind of seed from which their name is derived, and to be in sound condition. The report of the Consulting Chemist of the Bath and West and Southern Counties Society to be conclusive as to the " purity " or otherwise of any feeding-stuffs. The percentages of Oil and Albuminoids must also be guaranteed.

Mixed Feeding Cakes, Meals, etc., to be sold on a guaranteed analysis.

All Feeding-Stuffs to be sold in sound condition, and to contain nothing of a injurious nature or worthless for feeding purposes.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES FOR ANALYSIS.

GENERAL RULES.

1. A sample taken for analysis should be fairly *representative of the bulk* from which it has been drawn.

2.—The sample should reach the Analyst *in the same condition* as it was at the time when drawn.

FERTILISERS.

When **Fertilisers** are delivered in bags, select four or five of these from the bulk, and either turn them out on a floor and rapidly mix their contents, or else drive a shovel into each bag and draw out from as near the centre as possible a couple of shovelfuls of the manure, and mix these quickly on a floor.

Halve the heap obtained in either of these ways, take one-half (rejecting the other) and mix again rapidly, flattening down with the shovel any lumps that appear. Repeat this operation until at last only some three or four pounds are left.

From this fill three tins, holding from ½lb. to 1lb. each, mark, fasten up and seal each of these. Send one for analysis, and retain the others for reference.

Or,—the manure may be put into glass bottles provided with well-fitting corks; the bottles should be labelled and the corks sealed down. The sample sent for analysis can be packed in a wooden box and sent by post or rail.

When manures are delivered in bulk, portions should be successively drawn from *different parts* of the bulk, the heap being turned over now and again. The portions drawn should be thoroughly mixed, sub-divided, and, finally, samples should be taken as before, except that when the manure is coarse and bulky it is advisable to send larger samples than when it is in a finely-divided condition.

FEEDING-STUFFS.

Linseed, Cotton, and other Feeding Cakes.—If a single cake be taken three strips should be broken off right across the cake and from the middle portion of it, one piece to be sent for analysis, and the other two retained for reference. Each of the three pieces should be marked, wrapped in paper, fastened up and sealed. The piece forwarded for analysis can be sent by post or rail.

A more satisfactory plan is to select four to six cakes from different parts of the delivery, then break off a piece about four inches wide from the middle of each cake, and pass these pieces through a cake-breaker. The broken cake should then be well mixed, and three samples of about 1lb. each should be taken and put in tins or bags duly marked, fastened, and sealed as before. One of these lots should be sent for analysis, the emaining two being kept for reference. It is advisable also, with the broken pieces, to send a small strip from an unbroken cake.

Feeding Meals, Grain, etc.—Handfuls should be drawn from the centre of half-a-dozen different bags of the delivery : these lots should then be well mixed, and three ½lb. tins or bags filled from the heap, each being marked, fastened up, and sealed. One sample is to be forwarded for analysis and the others retained for reference.

SOILS, WATERS, &c.

Soils.—Have a wooden box made, 6 inches in length and width, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square ; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil and its subsoil 9 to 12 inches deep ; trim this block to make it fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up gently, turn over the box, nail on the lid, and send by rail. The soil will then be received in the position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil and forced down by pressure, and then dug out.

Waters.—Samples of water are best sent in glass-stoppered Winchester bottles holding half a gallon. One such bottle is sufficient for a single sample. Care should be taken to have these scrupulously clean. In taking a sample of water for analysis it is advisable to reject the first portion drawn or pumped, so as to obtain a sample of the water when in ordinary flow. The bottle should be rinsed out with the water that is to be analysed, and it should be filled nearly to the top. The stopper should be secured with string, or be tied over with linen or soft leather. The sample can then be sent carefully packed either in a wooden box with sawdust, etc., or in a hamper with straw.

Milk.—A pint bottle should be sent in a wooden box.

GENERAL INSTRUCTIONS.

Time for Taking Samples.—All samples, both of fertilisers and feeding-stuffs, should be taken as soon after their delivery as possible, and should reach the Analyst within *ten-days* after delivery of the article. In every case it is advisable that the Analyst's certificate be received before a fertiliser is sown or a feeding-stuff is given to stock.

Procedure in the event of the Vendor wishing Fresh Samples to be Drawn.—Should a purchaser find that the Analyst's certificate shows a fertiliser or feeding-stuff not to come up to the guarantee given him, he may inform the vendor of the result and complain accordingly. He should then send to the vendor *one* of the two samples which he has kept for reference. If, however, the vendor should demand that a fresh sample be drawn, the purchaser must allow this, and also give the vendor an opportunity of being present, either in person or through a representative whom he may appoint. In that case, three samples should be taken in the presence of both parties with the same precautions as before described, *each* of which should be duly packed up, labelled and *sealed* by both parties. One of these is to be given to the vendor, one is to be sent to the Analyst, and the third is to be kept by the purchaser for reference or future analysis if necessary.

All samples intended for the Consulting Chemist of the Society should be addressed (postage or carriage prepaid) to Dr. J. AUGUSTUS VOELCKER, M.A., F.I.C., Stuart House, 1, Tudor Street, New Bridge Street, London, E.C. Separate letters of instruction should be sent at the same time.

TAUNTON MEETING.

MAY 27, 28, 29, 30 and 31, 1924.

MONEY PRIZES.

		PAGE
HORSES	£1096 0 0	cxvi
CATTLE	1506 15 0	cxxiii
SHEEP	834 0 0	cxxix
GOATS	28 10 0	cxxxii
PIGS	566 0 0	cxxxii
CIDER	60 0 0	cxxxv
CHEESE	117 0 0	cxxxv
CREAM CHEESE, BUTTER AND CREAM ..	46 10 0	cxxxvi
BUTTER-MAKING	44 10 0	cxxxvii
MILKING	11 5 0	cxxxvii
SHOEING	53 10 0	cxxxviii
POULTRY	161 5 0	cxlix
	£4,525 5 0	

DONORS OF MEDALS, PLATE, &c.

H.R.H. The Prince of Wales, K.G.
Bath and West Society
Shire Horse Society
Hunters' Improvement and National Light Horse Breeding Society
Hackney Horse Society
Shorthorn Society
J. Hope Simpson, Esq., M.P.
Aberdeen-Angus Cattle Society
English Aberdeen-Angus Cattle Association
Argentine Aberdeen-Angus Cattle Association
English Kerry and Dexter Cattle Society
English Jersey Cattle Society
Southdown Sheep Society
Sir F. H. Bathurst, Bart., D.S.O.
British Goat Society
British Berkshire Society
Large Black Pig Society
National Pig Breeders' Association
Gloucestershire Old Spots Pig Society
Wessex Saddleback Pig Society
Poultry Club
Sussex Herd Book Society
Mrs. Cavill

DONORS OF MONEY PRIZES.

Bath and West and Southern Counties Society	£3500	18	4
Somerset County Agricultural Association	125	0	0
Taunton Local Committee	29	0	0
Shire Horse Society (or Medal)	10	0	0
Devon Cattle Breeders' Society	42	0	0
C. Morris, Esq.	10	10	0
South Devon Herd Book Society	15	5	0
Shorthorn Society	30	0	0
Dairy Shorthorn Association	10	0	0
E. Ezra, Esq.	17	0	0
Hereford Herd Book Society	20	0	0
Sussex Herd Book Society	17	0	0
British Friesian Cattle Society	93	6	8
English Aberdeen-Angus Cattle Association	20	0	0
Red Poll Cattle Society	25	0	0
Welsh Black Cattle Society	10	0	0
Meyrick Sir Geo.	15	0	0
Ayrshire Cattle Society	10	0	0
English Jersey Cattle Society	10	0	0
English Guernsey Cattle Society	25	0	0
English Kerry and Dexter Cattle Society	30	0	0
Devon Longwoolled Sheep Breeders' Society	10	0	0
Kent or Romney Marsh Sheep Breeders' Association	17	0	0
Southdown Sheep Society	17	0	0
Hampshire Down Sheep Breeders' Association	20	0	0
Oxford Down Sheep Breeders' Association	10	0	0
Dorset Horn Sheep Breeders' Association	51	0	0
Dorset Down Sheep Breeders' Association	20	0	0
Exmoor Horn Sheep Breeders' Society	21	0	0
Dartmoor Sheep Breeders' and Flock Book Association	10	0	0
Suffolk Sheep Society	25	0	0
Ryeland Flock Book Society	15	0	0
Kerry Hill Flock Book Society	12	0	0
British Goat Society	14	5	0
British Berkshire Society	9	0	0
Large Black Pig Society	40	0	0
National Pig Breeders' Association	20	0	0
Gloucester Old Spots Pig Society	50	0	0
Wessex Saddleback Pig Society	24	0	0
Welsh Pig Society	10	0	0
Long White Lop-Eared Pig Society	20	0	0
Somerset Agricultural Committee	45	0	0
	£4525	5	0

PRIZES.

The Prizes in Classes 26, 41 and 42 are offered by the Taunton Local Committee and £125 towards the Prizes in the Horses, Cattle, Sheep and Pig Classes by the Somerset County Agricultural Association.

An Animal can be entered in as many Classes as it is eligible for on payment of an additional fee in each Class. No additional fee is, however, payable in the case of those Prizes headed as Champion or Special Prizes.

HORSES.

Exhibitors are requested to note that Animals entered in Classes 1 to 9 must be in the Yard before 8 a.m. on Tuesday, May 27, and except the Stallions in Class 5, (which can **be removed after the Parade of Horses on the third day of the Show**) must remain in the Yard till 6 o'clock on Saturday, May 31.

SHIRE.

(Registered or eligible for registration in the Shire Horse Society's Stud Book).

Entry Fees, including Box: Members, 25/-; Non-Members, 50/- each entry.

Judge—F. W. GRIFFIN, Boro Fen, Peterborough.

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
1.—MARE, in-foal, or with foal at foot	15	10	3
2.—FILLY or GELDING, foaled in 1923	10	5	3
3.—FILLY or GELDING, foaled in 1922	10	5	3
4.—FILLY or GELDING, foaled in 1921	10	5	3
5.—STALLION, foaled in 1922	10	5	3
6.—COLT, foaled in 1923	10	5	3

MEDAL. (A)

Offered by the Shire Horse Society and open only to Members of the Bath and West Society elected not less than six months previous to March 31, 1924.

(A) A Gold Medal, or the sum of £5, for the best Mare or Filly in the Shire Horse Classes, under Condition 47, and to the Breeder of the 5
winner under the Condition stated, a Prize of 5

PERCHERONS.

Entry Fees, including Box: Classes 7 and 9: Members, 25/-; Non-Members, 50/-. Class 8, Members, 5/-; Non-Members, 10/- each entry.

Judge—Hon. A. E. PARKER, Norton Curlieu, Warwick.

Class.		First Prize. £	Second Prize. £	Third Prize. £
7.	—Mare, in-foal, or with foal at foot	10	5	3
8.	—Colt or Filly Foal, produce of Mare in Class 7	5	3	
9.	—Colt, Filly or Gelding, foaled in 1921 or 1922	10	5	3

HUNTERS.

Entry Fees, including Box: Members, 25/-; Non-Members, 50/- each entry.

Judge—Hon. A. E. PARKER, Norton Curlieu, Warwick.

Animals entered in Classes 10 to 18 must be in the Yard before 8 a.m. on Tuesday, May 27, and must remain there till 1 p.m. on Thursday, May 29th, when they must be removed from the Yard.

Class.		First Prize. £	Second Prize. £	Third Prize. £
10.	—Mare, in-Foal, or with Foal at Foot	15	10	3
11.	—Filly, Colt or Gelding, foaled in 1923	10	5	3
12.	—Filly, Colt or Gelding, foaled in 1922	10	5	3
13.	—Filly or Gelding, foaled in 1921	10	5	3
14.	—Mare or Gelding, foaled before 1921, that has not won a prize of £10 or over under saddle at any Show held previous to April 1, 1924	10	5	3
15.	—Mare or Gelding, foaled in 1920	10	5	3
16.	—Mare or Gelding, foaled before 1921, to carry not more than 12 stone 7 lbs.	20	10	3
17.	—Mare or Gelding, foaled before 1921, to carry over 12 stone 7lbs. and under 14 stone	20	10	3
18.	—Mare or Gelding, foaled before 1921 to carry 14 stone or over	20	10	3

MEDALS.

Offered by the Hunters' Improvement and National Light Horse Breeding Society, under Conditions 48 and 49.

(B) A Gold Medal, or £5 and a Bronze Medal, for the Best Hunter Brood Mare in Class 10, registered with a number in the Hunter Stud Book, at the time of entry or within a month of the award, not having previously won the above-named Society's Gold Medal as a Brood Mare in 1924, and which must have her foal at foot, or produce a living foal in 1924 to a thoroughbred horse or Registered Hunter sire. In the second instance a certificate to that effect must be forwarded before the Medal is sent.

C) A Silver Medal or £1 (at the option of the winner), for the best Hunter Mare or Gelding of any age, exhibited in Classes 14 to 18 by a member of the Hunters' Improvement and National Light Horse Breeding Society, whose application for membership must be lodged within a month of the award.

Only Prize-Winners in the Classes will be eligible for these Medals.

PONIES.

WELSH MOUNTAIN.

Animals entered in Classes 19 and 20 must be brought into the Yard after 6 p.m. on Thursday, May 29, and before 9 a.m. on Friday, May 30, and must remain in the Yard until 6 p.m. on Saturday, May 31.

Entry Fee : 10/- each entry.

Judge—J. E. HERBERT, Brynamman, Carmarthenshire.

Class.	First Prize. £	Second Prize. £	Third Prize. £
19.—Brood Mare, foaled in or before 1920, not exceeding 12·2 hands, neither docked nor hogged, in-foal or with foal at foot	10	5	3
20.—Stallion, foaled in or before 1920 not exceeding 12·2 hands and neither docked nor hogged ..	10	5	3

DARTMOOR

Animals entered in Classes 21 & 22 must be in the Yard after 6 p.m on Thursday, May 29, and before 8 a.m. on Friday, May 30, and must remain in the Yard until 6 p.m. on Saturday, May 31.

Entry Fee : 10/- each entry.

Judge—. B. PHILLPOTTS, Rora House, Ilsington, S. Devon.

Class.	First Prize. £	Second Prize. £	Third Prize. £
21.—Mare, not exceeding 13 hands, in-foal or with foal at foot	10	5	3
22.—Stallion, not exceeding 13 hands	10	5	3

EXMOOR

Animals entered in Classes 23 to 25 must be in the Yard before 2 p.m. on Friday, May 30, and can leave as soon as they have been judged and paraded.

Entry Fee : 5/- each entry.

Judge—R. J. COLLYNS, Bilboa, Dulverton.

Class.	First Prize. £	Second Prize. £	Third Prize. £
23.—Mare, not exceeding 12.2 hands, 2 years old and over on May 27, 1924, with or without foal at foot ; to be led	8	4	2
24.—Colt or Filly, under 2 years old on May 27, 1924 ; to be led	8	4	2
25.—Stallion, not exceeding 12.3, 2 years old and over on May 27, 1924 ; to be led	8	4	2

The Animals entered in Classes 23 to 25 must be registered or eligible for registration in the Exmoor Pony Society's Stud Book and must be shown in "natural condition," and not got up for Show. Prize-winning Animals, if not already registered, shall be registered and branded within one month after the termination of the Show, and the prize-money will not be paid till this has been done.

ANY AGRICULTURAL BREED.

Animals entered in Class 26 must be in the Yard by 9 a.m. on Saturday, May 31, and can leave after they have been judged and paraded.

Entry Fees : Members, 5/- ; Non-Members, 10/- each entry.

Judge—

Class.		First Prize. £	Second Prize. £	Third Prize. £
26.—	**Mare or Gelding, foaled before 1922, suitable for general work and the property of a resident within 20 miles of Taunton, to be shown in hand without gear .. ..**	5	2	1

REMOUNT SELLING CLASSES.

Entry Fees : Members, 5/- ; Non-Members, 10/- each entry.

Judge : Inspector of Remounts.

Animals entered in Classes 27 to 29 must be in the Yard by 10 a.m. on Wednesday, May 28, and can leave after they have been judged and paraded.

Class.		First Prize. £	Second Prize. £	Third Prize. £
27.—	MARE or GELDING, unbroken or partly broken, 3 years old not less than 15.2, and 4 years old not less than 15.3 hands, undocked, suitable for Officers' Chargers. To be shown in hand	10	5	
28.—	MARE or GELDING, not under 5 years nor over 7 years old ; not less than 15.3 nor over 16.1 hands, undocked, suitable for Officers' Chargers. To be ridden	10	5	
29.—	MARE or GELDING not under 4 years nor over 6 years old not less than 15.1½ nor over 15.3 hands, undocked, suitable for Artillery Gun Horses. To be ridden	10	5	

(The Inspector of Remounts will have the option of purchasing any Animal in Class 27 for £90 ; in Class 28 for £120 : and in Class 29 for £55).

SADDLE.

ENTRIES CLOSE.

With Boxes—April 1, *or at double fees, April* 8.

Without Boxes—At 12 *noon on the day preceding the competition.*

Entry Fees: With Box, Members, 25/- ; Non-Members, 50/- each entry ; Without Box: Members, 5/- ; Non-Members, 10/-.

Judge—Hon. A. E. PARKER, Norton Curlieu, Warwick.

Horses entered in other Classes can, if eligible, be also entered on payment of an additional fee in the Saddle Classes.

Horses entered in the Saddle Classes only, and not having a Box in the yard, must be in the Show Yard by 1 p.m. on the day on which they compete, and, with the consent of the Stewards, may leave the Yard as soon as the class has been judged.

CLASS	First Prize. £	Second Prize. £	Third Prize. £
30.—HACK MARE or GELDING 15 hands and over to be ridden on the 2nd day of the Show	10	5	2
31.—PONY, not over 13 hands, suitable for and to be ridden by a child not over 12 years of age last birthday, on the 2nd day of the Show ..	5	4	2
		Fourth £1.	

(A Whip will be presented to the best Boy and best Girl Riders in this Class.)

32.—HACK MARE or GELDING, any height, to be ridden by a lady on the 3rd day of the Show ..	10	5	2
33.—HACK MARE or GELDING, under 15 hands, to be ridden on the 4th day of the Show	10	5	2
34.—POLO PONY, not over 15 hands. 4 years old and over, to be ridden on the 5th day of the Show ..	10	5	2
35.—PONY, not over 14 hands, suitable for and to be ridden by a child not over 14 years of age last birthday, on the 5th day of the Show ..	5	4	2
		Fourth £1	

(A Whip will be presented to the best Boy and best Girl Riders in this Class).

HARNESS.

ENTRIES CLOSE.

With Boxes—April 1, *or at double fees, April* 8.

Without Boxes—At 12 *noon on the day preceding the competition.*

Entry Fees: With Box, Members, 25/- ; Non-Members, 50/- each entry; Without Box: Members, 5/- ; Non-Members, 10/-.

Judge—A. W. HICKLING, Wing Old Hall, Rutland.

Horses entered in other Classes can, if eligible, be also entered on payment of an additional fee in the Harness Classes.

Horses entered in the Harness Classes only, and not having a Box in the yard, must be in the Show Yard by 1 p.m. on the day on which they compete, and, with the consent of the Stewards, may leave the Yard as soon as the class has been judged.

36.—(Novice Class). MARE or GELDING, not over 14 hands that has not previously won a prize of over £5 in value in Single Harness at any show held previous to January 1. 1924 to be driven on the 1st day of the Show	10	5	3	2

HARNESS—*continued.*

Class.		First Prize.	Second Prize.	Third Prize.	Fourth Prize
		£	£	£	£
37.	—(Novice Class). Mare or Gelding, over 14 and not over 15 hands. that has not previously won a prize of over £5 in value in Single Harness at any Show held previous to January 1, 1924. to be driven on the 1st day of the Show ..	10	5	3	2
38.	—(Novice Class). Mare or Gelding, over 15 hands that has not previously won a prize of over £5 in value in Single Harness at any Show held previous to January 1, 1924, to be driven on the 2nd day of the Show	10	5	3	2

CHAMPION PRIZE.

(D)	**Best Mare or Gelding shown in Single Harness in Classes 36 to 38, to be judged on the 2nd day of the Show .. .. ..**	**10**			
39.	—Pair of Mares or Geldings, to be driven in Double Harness on the 3rd day of the Show	15	7	3	2
40.	—Tandems. Mares or Geldings, to be driven on the 3rd day of the Show	15	7	3	2

LOCAL TRADESMEN.

41.	**—Mare or Gelding, 14.3 hands or over, the property of a Tradesman carrying on business within the Borough of Taunton, used solely by him and driven regularly by himself or his servants, for the delivery of goods sold by him, for a period of not less than three months prior to May 27th, 1924, to be exhibited on the 3rd day of the Show in Wagon, Trolley, or Cart (not Dog Cart) ..**		**4**	**3**	**2**
			4th, £1 ; 5th, 10/-		
42.	**—Mare or Gelding, under 14.3 hands, ditto ditto ..**		**4**	**3**	**2**
			4th, £1 ; 5th, 10/-		

In Classes 41 and 42 points will be awarded for condition of horse, vehicle and harness and general turnout.

43.	—Mare or Gelding, not exceeding 14 hands, to be driven on the 4th day of the Show	15	7	3	2
44.	—Mare or Gelding, over 14 and not exceeding 15 hands, to be driven on the 4th day of the Show	15	7	3	2
45.	—Mare or Gelding, over 15 hands, to be driven on the 5th day of the Show	15	7	3	2

CHAMPION PRIZE.

(E)	**Best Mare or Gelding shown in any of the Open Harness Classes 39 to 45, to be judged on the 5th day of the Show ..**	**10**			

MEDAL (F).

Offered by the Hackney Horse Society under Conditions No. 50.

(F) A Silver Medal for the best Mare or Gelding exhibited in Single Harness in Classes 36 to 45, to be judged on the 5th day of the Show

JUMPING.

(UNDER SHOW JUMPING ASSOCIATION RULES).

ENTRIES CLOSE.

With Boxes—April, 1 *or at double fees, April* 8.
Without Boxes—At 12 *noon on the day preceding the competition.*

Entry Fees: With Box, Members, 25/-; Non-Members, 50/- each entry; Without Box: Members, 5/-; Non-Members, 10/-.

Judge—Lieut.-Col. Sir DENNIS F. BOLES, Bart., C.B.E., D.L., Watts House, Taunton.

The Society reserves the right to cancel the Classes for Jumping in the event of sufficient entries not being forthcoming. In such case notice will be given to Exhibitors and any Entry Fee paid will be returned.

(For Regulations as to Jumping Classes see Conditions 51).

Horses can be entered in as many Jumping Classes as they are eligible for on payment of the entry fee for each Class, and can take Second or Third Prize in each class, but only one First Prize in Classes 46 to 50. In the event of an animal which has already won a First Prize in the aforesaid Classes being again placed First, the Animal next in point of merit will, if eligible, succeed to the First Prize, and the Stewards reserve the right to amend the Awards correspondingly, and, if necessary, to proportionately reduce the amounts paid to the other Prize Winners in the Class. The award to two or more exhibits of an equal First by the Judges other than in the case of competitors agreeing to divide will not debar such Animals from taking a First Prize in a later class.

Horses entered in the Jumping Classes **only**, and not having a box in the Yard, must be in the Show Yard by 1 p.m. on the day on which they compete and, with the consent of the Stewards, may leave the Yard as soon as the Class has been judged. A covered shed will be provided for exhibits in these Classes.

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
46.—MARE or GELDING, any height, that shall jump over the course in the best form on the 1st day of the Show	10	5	2
47.—MARE or GELDING, under 14.2 hands, ditto, 1st day ..	10	5	2
48.—MARE or GELDING, 15 hands and over, that shall jump over the course in the best form on the 2nd day of the Show	10	5	2
49.—MARE or GELDING, under 15 hands, ditto, 2nd day..	10	5	2
50.—MARE or GELDING, any height, that shall jump over the course in the best form on the 3rd day of the Show	10	5	2
51.—MARE or GELDING, any height, that shall jump highest on the 3rd day of the Show	10	5	2
52.—MARE or GELDING, 14.3 hands and over, that shall jump over the course in the best form on the 4th day of the Show	15	7	3
53.—MARE or Gelding, under 14.3 hands, ditto, 4th day..	15	7	3
54.—MARE or GELDING, any height, that shall jump highest on the 5th day of the Show	15	7	3
CHAMPION CLASS.			
55.—MARE or GELDING, any height, having won a Prize in Classes 46 to 54 that shall jump over the course in the best form on the 5th day of the Show ..	20	10	5

(In this Class the whole of the Jumps will be raised at the discretion of the Stewards).

(In Classes 51 and 54, £1 will be added to the Prizes offered for every six inches over 5 feet cleared by the competing animal.)

CATTLE.

Entry Fees: Members, 17/6; Non-Members, 35/-, each entry.

DEVON.

Judge—F. J. YENDELL, Upcott, North Molton.

£27 towards the Prizes in the Devon Classes and the Champion Prize are contributed by the Devon Cattle Breeders' Society.

Class.	First Prize. £	Second Prize. £	Third Prize £
56.—Cow or Heifer, in-Milk, to be Milked in the Ring before judging, under Conditions No. 59	**10**	**5**	**2**
57.—Cow, in-Milk, calved before 1921	10	5	2
58.—Heifer, in-Milk, calved in 1921	10	5	2
59.—Heifer, calved in 1922	10	5	2
60.—Heifer, calved in 1923	10	5	2
61.—Bull, calved in or before 1921	10	5	2
62.—Bull, calved in 1922	10	5	2
63.—Bull, calved in 1923	10	5	2

CHAMPION PRIZES.

Offered by H.R.H. the Prince of Wales, K.G.

A Challenge Cup, value £30 for the best Bull exhibited in Class 61 62 or 63 to be won three times in succession or four times altogether before becoming the property of the winner.

Offered by the Devon Cattle Breeders' Society.

Best Animal exhibited in Classes 56 to 63 10

SPECIAL PRIZE.

Offered by C. Morris, Esq.

Best Group of three Females, calved in 1921, 1922, and 1923, bred by the Exhibitor and entered in Classes 58, 59 and 60. .. .. £10 10s.

SOUTH DEVON.

Judge—T. W. LUSCOMBE, Great Englebourne, Harberton, Totnes.

£10 towards the Prizes in the South Devon Classes are contributed by the South Devon Herd Book Society.

Class.	First Prize. £	Second Prize. £	Third Prize £
64.—Cow or Heifer, in-Milk, calved in or before 1921	**10**	5	2
65.—Heifer, calved in 1922	10	5	2
66.—Heifer, calved in 1923	10	5	2
67.—Bull, calved in or before 1922	10	5	2
68.—Bull, calved in 1923	10	5	2

CHALLENGE CUP.

Offered by the President (H.R.H. The Prince of Wales, K.G.).

A Silver Challenge Cup for the best Cow in-Milk in the South Devon Classes, to be won three times in succession or four times altogether before becoming the property of the Winner.

SHORTHORN.

Judge—Major C. BEHRENS, Swinton Grange, Malton, Yorks.

Class.	First Prize.	Second Prize.	Third Prize
	£	£	£
69.—Cow, in-Milk, calved before 1921	10	5	2
70.—Heifer, in-Milk, calved in 1921	10	5	2
71.—Heifer, calved in 1922	10	5	2
72.—Heifer, calved in 1923	10	5	2
73.—Bull, calved in 1920 or 1921	10	5	2
74.—Bull, calved in 1922	10	5	2
75.—Bull, calved in 1923	10	5	2

CHAMPION PRIZE.

Offered by the Shorthorn Society.

Best Bull in Classes 73 to 75 entered in, or eligible for entry in Coates's Herd Book, with Silver Medal to the Breeder	10		

DAIRY SHORTHORN.

Judge—Major G. J. BUXTON, Tockenham Manor, Wootton Bassett.

The First Prizes in Classes 76 and 77 (and a Silver Medal to the Breeder of the winners) are offered by the Shorthorn Society in conjunction with the Dairy Shorthorn Association, and the First Prize in Class 80 by the Dairy Shorthorn Association.

76.—Pedigree Cow, in-Milk, calved in or before 1920, eligible for, and entered in Coates's Herd Book, or pedigree sent for such entry previous to the Show, and not having previously won a similar prize offered by the above-named Society or Association in 1923, to be milked in the Ring before judging, under Conditions 59	10	5	2
77.—Ditto, calved in or after 1921, ditto, ditto	10	5	2

The Prizes in Class 78 are offered by E. Ezra, Esq., of Lock, Partridge Green, Sussex.

78.—Pedigree Heifer, calved in 1923, eligible for and entered in Coates's Herd Book or pedigree sent for such entry previous to the Show, subject to Conditions No. 60	10	5	2
79.—Pedigree Bull, calved before 1923	10	5	2
80.—Pedigree Bull, calved in 1923, entered or pedigree accepted for entry in Coates's Herd Book, subject to Conditions No. 60	10	5	2

SPECIAL PRIZE.

Offered by J. Hope Simpson, Esq., M.P.

A Silver Medal for the best Dairy Shorthorn Cow exhibited by a resident in Somerset.

HEREFORD.

Judge—G. H. BRAY, Dormington Court, Hereford.

81.—Cow, in-Milk, calved before 1921	10	5	2
82.—Heifer, in-Milk, calved in 1921	10	5	2
83.—Heifer, calved in 1922	10	5	2
84.—Heifer, calved in 1923	10	5	2
85.—Bull, calved in 1920 or 1921	10	5	2
86.—Bull, calved in 1922	10	5	2
87.—Bull, calved in 1923	10	5	2

CHAMPION PRIZES.

Offered by the Hereford Herd Book Society.

Best registered Cow or Heifer in Classes 81 to 84	10		
Best registered Bull in Classes 85 to 87	10		

SUSSEX.

Judge—Rev. F. S. SCLATER, Newick Park, Lewes.

£17 towards the Prizes in the Sussex Classes and the Silver Medals are offered by the Sussex Herd Book Society.

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
88.—Cow or Heifer, in-Milk, calved in or before 1921 ..	**10**	**5**	**2**
89.—HEIFER, calved in 1922 or 1923	10	5	2
90.—BULL, calved in 1921, 1922 or 1923	10	5	2

SILVER MEDALS.

Best Cow or Heifer in Class 88 or 89.
Best Bull in Class 90.

BRITISH FRIESIAN.

Judge—STUART HEATON, Iken, Tunstall, Suffolk.

£28 6s. 8d. towards the Prizes in the Friesian Classes are contributed by the British Friesian Cattle Society, and animals entered must be registered in the B.F.C.S. Herd Book proper, those registered in Supplementary Section not being eligible.

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
91.—COW or HEIFER, any age, in-Milk	**10**	**5**	2
92.—HEIFER, not in-Milk, calved in 1922	**10**	**5**	2
93.—HEIFER, calved in 1923	10	5	2
94.—BULL, calved in or before 1922	10	5	2
95.—BULL, calved in 1923	10	5	2

ABERDEEN-ANGUS.

Judge—J. H. BRIDGES, The Court, Eastbourne, Sussex.

£20 towards the Prizes in the Aberdeen-Angus Classes are contributed by the English Aberdeen-Angus Cattle Association

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
96.—COW or HEIFER, in-Milk, calved before 1st December, 1921	**10**	**5**	2
97.—HEIFER, calved on or after 1st December, 1921 ..	**10**	5	2
98.—HEIFER, calved on or after 1st December, 1922 ..	10	5	2
99.—BULL, calved before 1st December. 1922	10	5	2
100.—BULL, calved on or after 1st December, 1922 ..	10	5	2

CHAMPION PRIZES.

Offered by the Aberdeen-Angus Cattle Society.

A Silver Medal for the best Animal in Classes 96 to 100.

Offered by the English Aberdeen-Angus Cattle Association.

A Silver Medal for the best animal of opposite sex.

Offered by the Argentine Aberdeen-Angus Association.

A Silver Medal for the best Animal in Classes 96 to 100 bred by the Exhibitor.

CHALLENGE CUP.

Offered by the English Aberdeen-Angus Association.

The Venning Cup for the Exhibitor gaining the most points in the Aberdeen Angus Classes on the basis of 4 points for a first prize, 3 points for a second, 2 points for a third, one point for a Reserve, 2 points for a Championship, and one point for a Reserve Championship. The Cup to be won twice in succession or three times in all before becoming the property of the Exhibitor.

RED POLL.

Judge—J. S. THOMSON, Poulton Priory Farm, Fairford, Glos.

£20 towards the Prizes in the Red Poll Classes are contributed by the Red Poll Cattle Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
101.—Cow or Heifer, in-milk, calved before 1922 ..	10	5	2
102.—Heifer, calved in 1922	10	5	2
103.—Heifer, calved in 1923	10	5	2
104.—Bull, calved in or before 1922	10	5	2
105.—Bull, calved in 1923	10	5	2

WELSH BLACK.

Judge—R. W. PRITCHARD, Coedmarion, Carnarvon.

£10 towards the Prizes in the Welsh Black Classes are contributed by the Welsh Black Cattle Society, and £15 by Sir Geo. Meyrick, and animals must be registered or eligible for registration in the Welsh Black Cattle Herd Book

106.—Cow or Heifer, in-Milk, calved on or before November 30th, 1921	10	5	2
107 Heifer, calved on or between December 1st, 1921, and November 30th, 1922	10	5	2
108.—Heifer, calved on or between December 1st, 1922, and November 30th, 1923	10	5	2
109.—Bull, calved on or before November 30th, 1922 ..	10	5	2
110.—Bull, calved on or between December 1st, 1922, and November 30th, 1923	10	5	2

AYRSHIRE.

Judge—W. HUNTER, Templand Mains, Cummock.

£10 towards the Prizes in the Ayrshire Classes are contributed by the English Committee of the Ayrshire Cattle Herd Book Society.

111.—Cow, in Milk, calved in or before 1921	10	5	2
112.—Heifer, calved after 1921	10	5	2

JERSEY.

Judges—

Cows and Heifers—A. MILLER HALLETT, Goddington, Orpington, Kent.

Bulls—J. A. PERREE, Oaklands, St. Saviours, Jersey.

The Prizes in Class 113 are offered by the English Jersey Cattle Society.

113.—**Cow or Heifer, in-Milk, entered in or eligible for entry in the English Jersey Herd Book, sired in Great Britain or Ireland**	5	3	2
114.—Cow, in-Milk, calved before 1921	10	5	2
115.—Cow or Heifer, in-Milk, calved in 1921	10	5	2
116.—Heifer, in-Milk, calved in or since 1922.. ..	10	5	2
117.—Bull, calved before 1922	10	5	2
118.—Bull, calved in 1922	10	5	2
119.—Bull, calved in 1923	10	5	2

GUERNSEY.

Judge—C. F. DIXON, Arundel House, Winchester Road, Southampton.

£20 towards the Prizes in the Guernsey Classes are contributed by the English Guernsey Cattle Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
120.—Cow in-Milk, calved before 1921	10	5	2
121.—Heifer, in-Milk, calved in 1921	10	5	2
122.—Heifer, calved in 1922	10	5	2
123.—Heifer, calved in 1923	10	5	2
124.—Bull, calved in 1920 or 1921	10	5	2
125.—Bull, calved in 1922	10	5	2
126.—Bull, calved in 1923	10	5	2

KERRY.

Judge—G. T. BARHAM, Sudbury Park, Wembley, Middlesex.

£15 towards the Prizes in the Kerry Classes are contrbuted by the English Kerry and Dexter Cattle Society.

127.—Cow or Heifer, in-Milk, calved in or before 1921	10	5	2
128.—Heifer, calved in 1922 or 1923	10	5	2
129.—Bull, calved in 1921, 1922 or 1923	10	5	2

DEXTER.

Judge—G. T. BARHAM, Sudbury Park, Wembley, Middlesex.

130.—Cow or Heifer, in-Milk, calved in or before 1921	10	5	2
131.—Heifer, calved in 1922 or 1923	10	5	2
132.—Bull, calved in 1921, 1922 or 1923	10	5	2

The Prizes in Class 133 are offered by the English Kerry and Dexter Cattle Society.

133.—Bull, calved in 1923, whose sire and dam are entered in the English Kerry and Dexter or Royal Dublin Society's Herd Book	10	3	2

SPECIAL PRIZE.

Offered by the English Kerry and Dexter Cattle Society.

The Devonshire Challenge Cup, for the Best Animal in Classes 130 to 133, bred by Exhibitor, and entered in or eligible for the English Kerry and Dexter Herd Book. The Cup to be won by the same Exhibitor with different animals three years in succession before becoming his absolute property.

The Certificate of Award of the English Kerry and Dexter Cattle Society will be given to the owner of the winning animal on each occasion the Cup is competed for.

MILK TEST.

(See Regulation 62).

Judge—A. F. SOMERVILLE, Dinder House, Wells, Somt.

Animals entered in the Breed Classes can, if eligible, be entered also, on payment of an additional fee of 10/- *for Members and* 20/- *for Non-Members, in Classes* 134 *to* 137.

Class.	First Prize. £	Second Prize. £	Third Prize £
134.—Cow, in-Milk, of any breed or cross, under 950lbs. live weight, yielding the largest quantity of milk, of normal character, containing at each time of milking not less than 3 per cent. fat, the period of lactation being taken into consideration ..	10	5	2
135.—Cow, in-Milk, of any breed or cross, 950lbs. live weight or over, ditto, ditto	10	5	2

SPECIAL PRIZE.

Offered by the British Friesian Cattle Society to the owner of the Cow awarded the greatest number of points in Classes 134 and 135, provided that such Cow is a British Friesian..	50		

BUTTER TEST.

(See Regulation 62.)

Judge—A. F. SOMERVILLE, Dinder House, Wells, Somt.

136.—Cow, of any breed or cross, under 950lbs. live weight, obtaining the greatest number of points by the practical test of the separator and churn..	5	3	2
137.—Cow, of any breed or cross, 950lbs. live weight and over, ditto, ditto	5	3	2

SPECIAL PRIZES.

Offered by the respective Breed Societies.

For the Devon Cow obtaining the best results	**5**
For the South Devon Cow obtaining the best results ..	**£5 5s.**
For the British Friesian Cow obtaining the best results ..	**£5**
For the Red Poll Cow obtaining the best results ..	**£5**
For the three Jersey Cows obtaining the best results ..	**Gold, Silver and Bronze Medals.**
For the Guernsey Cow obtaining the best results ..	**£5**
A further Special Prize of £10 is offered by the British Friesian Cattle Society to the owner of the British Friesian Cow obtaining more points in the tests than any other animal of any Breed	**£10**

SHEEP.

Entry Fees: Members, 15/-; Non-Members, 30/- each entry.

DEVON LONGWOOLLED.

£10 towards the prizes in these Classes are contributed by the Devon Longwoolled Sheep Breeders' Society.

Judge—R. COOK, Crazelowman, Tiverton.

Class.	First Prize. £	Second Prize. £	Third Prize £
138.—Shearling Ram	10	5	2
139.—Pair of Ram Lambs, dropped in 1924	10	5	2
140.—Pen of three Shearling Ewes	10	5	2

SOUTH DEVON.

Judge—S. G. HORTON, Lixton, Loddeswell, Devon.

Class.	First Prize. £	Second Prize. £	Third Prize £
141.—Shearling Ram	10	5	2
142.—Pair of Ram Lambs, dropped in 1924	10	5	2
143.—Pen of three Shearling Ewes	10	5	2

KENT OR ROMNEY MARSH.

Judge—H. B. AMOS, Ripton, Ashford, Kent.

£17 towards the Prizes in these Classes are offered by the Kent or Romney Marsh Sheep Breeders' Association.

Class.	First Prize. £	Second Prize. £	Third Prize £
144.—Two Shear Ram	10	5	2
145.—Shearling Ram	10	5	2
146.—Pair of Ram Lambs, dropped in 1924	10	5	2
147.—Pen of three Shearling Ewes	10	5	2

SOUTHDOWN.

Judge—A. C. HARRIS, Donnington Manor, Chichester.

£17 towards the Prizes in these Classes are offered by the Southdown Sheep Society.

Class.	First Prize. £	Second Prize. £	Third Prize £
148.—Two Shear Ram	10	5	2
149.—Shearling Ram	10	5	2
150.—Pen of three Shearling Ewes	10	5	2

SPECIAL PRIZE.

Offered by the Southdown Sheep Society, under Condition 65, subject to there being at least three competitors.

Silver Medal or £1 for the best Ram in Classes 148 and 149.

HAMPSHIRE DOWN.

Judge—T. A. E. HAYTER, Highbury, Whitchurch, Hants.

£15 towards the Prizes in these Classes and the Champion Prize are offered by the Hampshire Down Sheep Breeders' Association.

Class.	First Prize. £	Second Prize. £	Third Prize £
151.—Shearling Ram	10	5	2
152.—Ram Lamb, dropped in 1924	7	5	3
153.—Pair of Ram Lambs, dropped in 1924	10	5	2
154.—Pen of three Shearling Ewes	10	5	2

CHAMPION PRIZE.

Class.	First Prize. £	Second Prize. £	Third Prize £
Best Ram, Ram Lamb, Pair or Pen, in Classes 151 to 154	5		

OXFORD DOWN.

Judge—C. E. J. HOBBS, Maisey Hampton, Fairford.

CLASS.	First Prize.	Second Prize.	Third Prize.
155.—Shearling RAM	10	5	2
156.—Pair of RAM LAMBS, dropped in 1924	10	5	2
157.—Pen of three Shearling EWES	10	5	2

The Prizes in Class 158 are offered by the Oxford Down Sheep Breeders' Association, and will be withheld until the Animals awarded the Prizes are registered in the Flock Book.

	First Prize.	Second Prize.	Third Prize.
158.—Pen of three Ewe Lambs dropped in 1924	**6**	**3**	**1**

DORSET HORN.

Judge—C. HAWKINS, Waddon, Upwey, Dorchester.

(The Animals entered in Classes **159**, **161** and **163** must have been shorn bare in the year of the Show.

	First Prize.	Second Prize.	Third Prize.
159.—Shearling RAM	10	5	2
160.—Pair of RAM LAMBS, dropped after November 1st, 1923	10	5	2
161.—Pen of three Shearling EWES	10	5	2

The Prizes in these Classes are offered by the Dorset Horn Sheep Breeders' Association.

	First Prize.	Second Prize.	Third Prize.
162.—Pen of three Ewe Lambs, dropped after Nov. 1. 1923	**10**	**5**	**2**
163.—Pen of three Shearling Ewes the property of a member of the Dorset Horn Sheep Breeders' Association, who has not won a prize at the Royal, Bath and West or Royal Counties Shows during the last four years	**10**	**5**	**2**
164.—Pen of three Ewe Lambs, ditto, ditto	**10**	**5**	**2**

DORSET DOWN.

Judge—T. LEE, Woodsford, Dorchester.

£15 towards the Prizes in these Classes and the Champion Prize are contributed by the Dorset Down Sheep Breeders' Association.

	First Prize.	Second Prize.	Third Prize.
165.—SHEARLING RAM	10	5	2
166.—Pair of RAM LAMBS, dropped in 1924	10	5	2
167.—Pen of three SHEARLING EWES	10	5	2

CHAMPION PRIZE.

	First Prize.	Second Prize.	Third Prize.
Best Ram, Pair or Pen, in the Dorset Down Classes	5		

EXMOOR HORN.

Judge—W. GAMMIN, The Barton, Simonsbath, Somerset.

£21 towards the Prizes in these Classes are contributed by the Exmoor Horn Sheep Breeders' Society.

	First Prize.	Second Prize.	Third Prize.
168.—RAM, 2 Shear and upwards	10	5	2
169.—Shearling RAM	10	5	2
170.—Pair of RAM LAMBS, dropped in 1924	10	5	2
171.—Pen of three Shearling EWES	10	5	2
172.—Pair of EWE LAMBS, dropped in 1924	10	5	2

DARTMOOR.

Judge—S. BICKELL, Westcott, Coryton, Lew Down.

£10 towards the Prizes in these Classes are contributed by the Dartmoor Sheep Breeders' and Flock Book Association and the Sheep exhibited must be shown in wool.

Class.	First Prize. £	Second Prize. £	Third Prize. £
173.—Ram. 2-shear and upwards	10	5	2
174.—Shearling Ram	10	5	2
175.—Pen of three Shearling Ewes	10	5	2

SUFFOLK.

Judge—N. EVERETT, Rushmere, nr. Ipswich.

£25 towards the Prizes in these Classes are contributed by the Suffolk Sheep Society.

	First Prize. £	Second Prize. £	Third Prize. £
176.—Ram, 2 Shear and upwards	10	5	2
177.—Shearling Ram	10	5	2
178.—Pair of Ram Lambs, dropped in 1924	10	5	2
179.—Pen of three Ewe Lambs, dropped in 1924	10	5	2

CHAMPION PRIZE.

Offered by Sir F. Hervey Bathurst, Bart., D.S.O.

A Silver Cup for the best Ram, Pair or Pen, in the Suffolk Classes. The Cup to be won three years in succession before becoming the absolute property of the winner.

RYELAND.

Judge—T. E. DAVIES, Winkfield Manor Farm, Ascot.

£15 of the Prizes in these Classes are offered by the Ryeland Sheep Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
180.—Ram, 2 Shear and upwards	10	5	2
181.—Shearling Ram	10	5	2
182.—Pair of Ram Lambs, dropped in 1924	10	5	2
183.—Pen of three Shearling Ewes	10	5	2

KERRY HILL.

Judge—J. HAMAR, The Farlauds, Brampton Bryan, Herefordshire.

£12 towards the Prizes in Classes 184 to 186 are contributed by the Kerry Hill (Wales) Flock Book Society, and animals must be shown uncoloured; the names and Flock Book Number of Rams must be given and in Class 186 the Ewes must be bred from one Flock and the Breeder's name must be given.

	First Prize. £	Second Prize. £	Third Prize. £
184.—Ram, 2 Shear and upwards	10	5	2
185.—Shearling Ram	10	5	2
186.—Pen of three Shearling Ewes	10	5	2

CHAMPION PRIZE.

Offered by H.R.H. The Prince of Wales, K.G.

A Challenge Cup, value £20, for the best animal exhibited in Class 185 or 186 to be won three times in succession or four times altogether before becoming the property of the Exhibitor.

GOATS.

(For Regulations see Entry Forms).

Entry Fees : Members, 7/6 ; Non-Members 10/- each entry.

Judge—H. S. HOLMES PEGLER, Coombe Bury House, Kingston-on-Thames.

£14 5s. 0d. towards the Prizes in these Classes are contributed through the British Goat Society. CLASS.	First Prize. £	Second Prize. £	Third Prize. £
187.—FEMALE GOAT, in-milk, any age, Toggenburg, British Toggenburg, British Alpine, Saanen, or British Saanen	2 10	1 10	15 0
188.—FEMALE GOAT, in-Milk, any age. Any other variety	2 10	1 10	15 0
189.—GOATLING.—Any variety, over one year, but not exceeding two years	2 10	1 10	15 0
190.—MALE GOAT. Any variety, over one year, but not exceeding two years	2 10	1 10	15 0
191.—MALE GOAT. Any variety, over two years ..	2 10	1 10	15 0
192.—MILKING COMPETITION. for quantity and time only (three milkings)	2 10	1 10	15 0

Special Prizes offered by the British Goat Society.

A Challenge Certificate for the Best Female Goat over two years that has borne a kid.

A Challenge Certificate for the Best Dual Purpose Goat over two years that has borne a kid.

A Challenge Certificate for the Best Male Goat over one year.

A Bronze Medal for the Best Female exhibit.

Whilst the Prizes awarded at this Show will also be included in the awards for the British Goat Society's "Breeder's" Perpetual Challenge Cup.

PIGS.

Entry Fees : Members, 15/- ; Non-Members, 30/- each entry.

BERKSHIRE.

Judge—J. CROWE, Woodhouse, Aldford, Chester.

£9 towards the Prizes in these Classes are contributed by the British Berkshire Society, and ages are calculated to May 27, 1924.

CLASS.	First Prize. £	Second Prize. £	Third Prize. £
193.—BOAR, exceeding 18 months old	10	5	2
194.—BOAR, not exceeding 18 months old	7	4	2
195.—Breeding Sow, exceeding 18 months old.. ..	10	5	2
196.—Breeding Sow, not exceeding 18 months old ..	7	4	2

CHALLENGE CUPS (Value £10 10s. each).

Offered by the British Berkshire Pig Society.

To be won twice in succession or three times in all before becoming the property of the Exhibitor.

Best Boar in Classes 193 or 194.

Best Sow in Classes 195 or 196.

A Silver Medal will be awarded to the Breeder of the prize-winning Animals.

LARGE BLACK.

Judge—H. J. KINGWELL, Bow Grange, Totnes, Devon.

£40 towards the prizes in these Classes and the Champion Prizes are contributed by the Large Black Pig Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
197.—Boar, farrowed before May 1, 1923	10	5	2
198.—Boar, not exceeding 12 months old on May 1, 1924	10	5	2
199.—Boar, farrowed in 1924	7	4	2
200.—Breeding Sow, farrowed before May 1, 1923	10	5	2
201.—Breeding Sow, not exceeding 12 months old on May 1, 1924	10	5	2
202.—Pair of Breeding Sows, farrowed in 1924	7	4	2

CHAMPION PRIZES.

Best Animal in Classes 197 to 199 .. .. .. Silver Medal
Best Animal in Classes 200 to 202 .. .. .. Silver Medal.

LARGE WHITE.

Judge—R. W. CARSON, Lea Hall, Hatfield Heath, Essex.

£10 towards the prizes in these Classes and the Champion Prize are offered by the National Pig Breeders' Association.

Class.	First Prize. £	Second Prize. £	Third Prize. £
203.—Boar, farrowed in 1921, 1922 or 1923	10	5	2
204.—Boar, farrowed in 1924	7	4	2
205.—Breeding Sow, farrowed before 1924	10	5	2
206.—Pair of Breeding Sows, farrowed in 1924	7	4	2

CHAMPION PRIZE.

A GOLD MEDAL or £5 for the Best Animal in Classes 203 to 206.

MIDDLE WHITE.

Judge—W. IKIN, Foxleigh, Wem, Shropshire.

£10 towards the Prizes in these Classes and the Champion Prizes are offered by the National Pig Breeders' Association.

Class.	First Prize. £	Second Prize. £	Third Prize. £
207.—Boar, farrowed in 1921, 1922 or 1923	10	5	2
208.—Boar, farrowed in 1924	7	4	2
209.—Breeding Sow, farrowed before 1924	10	5	2
210.—Pair of Breeding Sows, farrowed in 1924	7	4	2

CHAMPION PRIZE.

A GOLD MEDAL or £5 for the Best Animal in Classes 207 to 210

GLOUCESTERSHIRE OLD SPOTS.

Judge—J. B. DOWDING, Fairfield, Leominster.

£50 towards the Prizes in these Classes are contributed by the Gloucestershire Old Spots Pig Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
211.—Boar, farrowed before 1923	10	5	2
212.—Boar, farrowed in 1923	10	5	2
213.—Boar, farrowed in 1924	7	4	2
214.—Breeding Sow, farrowed before 1923	10	5	2
215.—Breeding Sow, farrowed in 1923	10	5	2
216.—Pair of Breeding Sows, farrowed in 1924	7	4	2

GLOUCESTERSHIRE OLD SPOTS—*Continued.*

CHAMPION PRIZES.

Offered through the Gloucestershire Old Spots Pig Society.

The Sir George Watson Challenge Cup, value £21, for the best Animal in Classes 211 to 216. (The Cup to be won three times by the same Exhibitor with different animals before becoming his own property).

The Deane-Drummond Cup, value £14 14s. for the best Boar in Classes 211 to 213. (The Cup to be won twice by the same exhibitor with different animals before becoming his own property.

The Sir John Anderson Challenge Cup for the best Sow in Classes 214 to 216. The Cup to be won twice by the same Exhibitor with different animals before becoming his own property.

WESSEX SADDLEBACK.

Judge—E. E. RALLS, Wade Park Farm, Totton, Hants.

£24 towards the Prizes in these Classes and the Special Prizes are offered by the Wessex Saddleback Pig Society, and all pigs exhibited must be entered or eligible for entry in that Society's Herd Book.

Class.	First Prize. £	Second Prize. £	Third Prize. £
217.—Boar, farrowed in 1923	10	5	2
218.—Boar, farrowed in 1924	7	4	2
219.—Breeding Sow, farrowed before 1923	10	5	2
220.—Breeding Sow, farrowed in 1923	10	5	2
221.—Pair of Breeding Sows, farrowed in 1924	7	4	2

GOLD MEDAL.

Value £5 5s. for the best Pig exhibited in Classes 217 to 221, and a Silver Medal to the Breeder who is not the exhibitor of the Animal winning the Gold Medal.

WELSH.

Judge—T. BOWEN, Llandre, Llanfyrnach, Pembs.

£10 towards the Prizes in these Classes are contributed by the Welsh Pig Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
222.—Boar, any age	10	5	2
223.—Breeding Sow, farrowed before June 1, 1923 ..	10	5	3
224.—Breeding Sow, born after June 1, 1923 ..	7	4	2

LONG WHITE LOP-EARED.

Judge—R. R. DAWE, Ford, Sydenham Damerel, Tavistock.

£20 towards the Prizes in these Classes are contributed by the Long White Lop-Eared Pig Society.

Class.	First Prize. £	Second Prize. £	Third Prize. £
225.—Boar, farrowed on or before October 1, 1923 ..	10	5	2
226.—Boar, farrowed since October 1, 1923	7	4	2
227.—Sow, any age, in farrow, or with farrow not exceeding 8 weeks old on 1st day of Show	10	5	2
228.—Sow, farrowed since March 1st, 1923	7	4	2
229.—Pair of Breeding Sows, farrowed in 1924 ..	7	4	2

PRODUCE.

CIDER.

(Open to Growers or Makers).

Entry Fees: Members, 3/6; Non-Members, 6/- each entry.

Judge—A. T. PRICE, Blackhall, Berkeley, Glos.

Cider entered in the Novice Class can also be entered in the Open Class for which it is eligible.

Class		First Prize. £	Second Prize. £	Third Prize £
230.—	NOVICE CLASS. Cask of not less than 9 and not more than 30 gallons of CIDER made in 1923 by an Exhibitor who has not previously taken a first prize in any public exhibition	5	3	2
231.—	Cask of not less than 9 and not more than 30 gallons of CIDER, made in 1923, of a specific gravity not exceeding 1.015 at 60 deg. Fahr.	5	3	2
232.—	12 Quart Bottles of CIDER, made in 1923, ditto ..	5	3	2
233—	Cask of not less than 9 and not more than 30 gallons of CIDER, made in 1923	5	3	2
234.—	12 Quart Bottles of CIDER, made in 1923	5	3	2
235.—	12 Quart Bottles of CIDER, made in any year previous to 1923	5	3	2

CHEESE.

Entry Fees: Class 236. Members, 10/-; Non-Members, 20/-. Classes 237 to 240: Members, 7/6; Non-Members, 15/-; Classes 241 to 243, 3/6.

Judge—A. TODD, British Dairy Institute, Reading.

Class		First Prize	Second Prize	Third Prize
236.—	Three Cheddar CHEESES (not less than 56lbs. each) made in 1923	15 0	10 0	5 0
237.—	NOVICE CLASS. Three Cheddar CHEESES, not over 56lbs. each, made in 1923 by an Exhibitor who has not previously won a prize for Cheese at the London Dairy Show or the Shows of the Royal Agricultural or Bath and West Society ..	8 0	5 0	3 0
238.—	Three Cheddar CHEESES (not over 56lbs. each), made in 1923	10 0	7 0	4 0
239.—	Four Loaf or other Truckle CHEESES, made in 1923	5 0	3 0	2 0
240.—	Three Caerphilly CHEESES, made in 1924	5 0	3 0	2 0

The Prizes in Classes 241 to 243 are offered by the Somerset County Council.

Class		1st	2nd	3rd	4th
241.—	**Three Cheddar Cheeses, made by Students who have received instruction provided by the County Council .. .. ..**	**6 0**	**3 0**	**2 0**	**1 0**
242.—	**Three Caerphilly Cheeses, made by persons who have received instruction in Cheese-making provided by the County Council..**	**5 0**	**3 0**	**1 0**	
243.—	**Three Caerphilly Cheeses, made by persons occupying a Small Holding of not more than 50 acres in Somerset .. ..**	**5 0**	**3 0**	**1 0**	

CREAM CHEESE, BUTTER AND CREAM.

(*These Classes are not open to Professional Teachers.*)

Entry Fees: Members, 3/6; Non-Members, 6/-

Judge—Mrs. A. M. LUKE, 9, St. James's Place, The Hoe, Plymouth.

Class.	First Prize. £	s.	Second Prize. £	s.	Third Prize. £	s.	Fourth Prize. £	s.
244.—Three Cream or other Soft Cheeses ..	3	0	2	0	1	0	0	10
245.—2lbs. of Fresh (or very slightly salted) Butter	4	0	3	0	2	0	1	0
246.—2lbs. of Butter, in the making of which no salt has been used, to be judged on the last day of the Show	4	0	3	0	2	0	1	0
247.—12lbs. of Keeping Butter, in a jar or crock, to be delivered to the Secretary 4 weeks before the Show	5	0	4	0	3	0	2	0
248.—Four half-pounds of Scalded Cream ..	3	0	2	0	1	0		

COMPETITIONS.

BUTTER-MAKING.

(*No Winner of a first prize given by this Society for Butter-making during the last 3 years is eligible to compete in Class* 251 *or* 252.)

Entry Fees: Class 249, 3/6 each entry; Classes 250 to 254, Members, 3/6; Non-Members, 6/-.

Judge— Mrs. A. M. LUKE, 9, St. James's Place, The Hoe, Plymouth.

(*For Conditions and Regulations see Entry Form.*)

CLASS.	First Prize. £	s.	Second Prize. £	s.	Third Prize. £	s.	Fourth Prize. £	s.
249.—For Children under 14 years of age, attending School. On the 1st day of the Show	3	0	2	0	1	0	0	10
250.—NOVICE CLASS. For Competitors who have not hitherto won a prize for Butter-making at the London Dairy Show or the Shows of the Royal Agricultural or Bath and West Society. On the 2nd day of the Show	4	0	3	0	1	10	1	0
251.—For Men and Women, bona fide workers on a farm. On the 3rd day of the Show	4	0	3	0	1	10	1	0
252.—For Students who have been through a course of instruction in Butter-making at any County Council School, and who have not previously won a first or second prize at one of the Society's Shows. On the 4th day of the Show	4	0	3	0	1	10	1	0
253.—For Men and Women. On the 4th day of the Show	4	0	3	0	1	10	1	0
254.—For Winners of First and Second Prizes in the Butter-making Classes 249 to 253, or at any previous meeting of the Society. On the 5th day of the Show. 1st Prize, Gold Medal. 2nd „ Silver Medal. 3rd „ Bronze Medal.								

MILKING.

Entry Fees: 2/6 each entry.

Judge—J. MACKINTOSH, National Institute for Research in Dairying, Shinfield, near Reading.

CLASS.								
255.—For Men, 16 years of age and over ..	2	0	1	0	0	15		
256.—For Women, 16 years of age and over ..	2	0	1	0	0	15		
257.—For Boys and Girls under 16 years of age ..	1	10	1	0	0	15	0	10

SHOEING.

Entry Fees: Members, 3/6; Non-Members, 6/- each entry.

Judge—J. C. COLEMAN, M.R.C.V.S., The Limes, Croft Road, Swindon.

Class.	First Prize.		Second Prize.		Third Prize.		Fourth Prize.	
	£	s.	£	s.	£	s.	£	s
258.—For Cart Horse Shoeing by Smiths. On the 2nd day of the Show	4	0	3	0	2	0	1	0
259.—For Nag Horse Shoeing by Smiths. On the 3rd dayof the Show	4	0	3	0	2	0	1	0
260.—For Hunter Shoeing by Smiths. On the 4th day of the Show	4	0	3	0	2	0	1	0
261.—For Shoe Making or Turning by Smiths, the patterns and descriptions of the Shoes to be supplied by the Judge. On the 5th day of the Show	4	0	3	0	1	0	0	10

SPECIAL LOCAL PRIZES.

Offered by the Somerset County Council.

Best Competitors in Class 258, resident in Somerset.. ..	**3**	**0**	**2**	**0**
Best Competitors in Class 259, resident in Somerset.. ..	**3**	**0**	**2**	**0**
Best Competitors in Class 260, resident in Somerset.. ..	**3**	**0**	**2**	**0**

CONDITIONS AND REGULATIONS FOR LIVE STOCK.

GENERAL.

ENTRIES.

1. The following are the Fees payable for Stock entries made on or before April 1. After that date and up to April 8, entries (except in the Any Agricultural, Harness, Saddle and Jumping Classes) will only be received on payment, in each case, of double the fee named below. *Exhibitors are requested to note that no exception can be made to this.* The entry fee is not returnable to an Exhibitor who enters an Animal in a Class for which it is ineligible, or for entries that are withdrawn after the date of entry has expired.

	MEMBERS (see Reg. 4 below)	NON-MEMBERS
Shire Horses, Percherons and Hunters for each entry, including Horse Box	25s.	50s.
Welsh and Dartmoor Ponies, including Box	10s.	10s.
Exmoor Ponies..	5s.	5s.
Any Agricultural Horses, Harness, Saddle and Jumping, without Box for each Entry	5s.	10s.
Ditto, with Box .. .. for each Entry	25s.	50s.
Cattle .. .. for each Entry	17s. 6d.	35s.
Nurse Cows .. .. for each Entry	40s.	40s.
Sheep and Pigs .. .. for each Entry	15s.	30s
Goats .. .. for each Entry	7s. 6d.	10s

For particulars as to fees in the Produce, Butter-making, Milking, Shoeing and Poultry Classes, see Entry forms.

2. Animals entered in the Any Agricultural, Harness, Saddle and Jumping Classes, and not having a box in the Yard, must be in the Yard by the time stated on the day on which they compete, and, with the consent of the Stewards may leave the Yard as soon as they have been judged. Entries in these Classes, if no Box is required, must reach the Secretary not later than 12 noon on the day previous to the competition for which the animal is entered. If a Box is required the entry must reach the Secretary on or before April 1, or at double fees as stated above, by April 8.

3. **No Entry will be received unless the fee accompanies it, and (if the Exhibitor is a Member of the Society) the subscription for the year, unless previously paid, together with any arrears that may be due.**

4. The privilege of entering at Members' fees is strictly limited to members of the Society, or of the Somerset County Agricultural Association, elected on or before January 31, 1924, and subscribing not less than £1 annually, or if elected after that date who has paid his subscription for 1924 and an additional £1 before the date of the closing of entries.

5. **Where a Prize is offered for a *pair or pen* of Animals, single entry fees only are payable for each *pair or pen*, and only one entry form must be used.**

6. **Exhibitors desiring to send a nurse cow with their exhibits must give notice at the time of making their entry.**

7. All Entries must be made on the printed forms to be obtained of the Secretary (F. Holland Storr, 3, Pierrepont Street, Bath), and, in applying for Forms, Exhibitors are requested to state how many entries they wish to make of either Horses, Cattle, Sheep, Goats or Pigs, as a separate entry form must be filled up for each animal entered in a separate class.

8. Every Exhibitor or Competitor is requested to carefully examine the List of Prizes and Conditions, as he will be held responsible for the correctness of his Certificate of Entry. An Exhibitor omitting to give information asked for on the entry form, with regard to the age, breeder, name, colour, sire, dam, &c., of an animal, will be liable to have his entry disqualified, and, if an exhibitor desires that his animal shall compete for any special prize offered, he must notify this on the entry form where requested to do so.

9. If an Exhibitor or Competitor fails, when called upon by the Stewards or Council, to prove the correctness of his Certificate of Entry to their satisfaction, the Entry may be disqualified and any award made to it cancelled.

10. An Exhibitor who has made, in due time, an entry of Horses, Cattle, Sheep, goats or Pigs, in a particular class, will be permitted, up to Monday, April 21, to withdraw the entry of such animal, and to substitute for it the entry of another animal in the same class, on payment of the difference, if any, between the amount of the entry fee originally paid for the animal withdrawn, and the post entry fee. When, after entry, an animal dies, the exhibitor will be permitted to substitute another entry for it, in the same class, without payment of any further fee, upon affording evidence of death and furnishing particulars of the substituted entry in time for the alteration to be made in the published catalogue.

11. An animal can be entered in as many Classes as it is eligible for on payment of an additional fee in each Class. No additional fee is, however, payable in the case of Special or Champion Prizes for exhibits already entered in any particular Class.

12. Every exhibit must be the *bona fide* property of the Exhibitor both at the time of entry and on the first day of the Exhibition. For the purposes of this Meeting H.M. Officer's chargers will be considered as the property of the Officer in Classes 46 to 55.

SHOW YARD.

13. The Yard will be open for the reception of Horses (see Regulation 2 for Any Agricultural, Harness, Saddle and Jumping Horses), Cattle, Sheep, Goats and Pigs, on Saturday and Monday, May 24 and 26, from 7 a.m. to 6 p.m. Shire and Percheron Horses and Hunters will also be received from 6 to 8 o'clock on the morning of the first day of Show, but all other Stock Entries (except Ponies, which must be in the Yard before the time stated on Friday, May 30), must be in the Yard the previous day. A label denoting the number of each entry will be sent by the Secretary, and must be securely affixed to the head of the Animal. The carriage of exhibits must in all cases be paid by the Exhibitor. No exhibit subject to charges will be received by Officers of the Society.

14. If an animal is brought into the Show Yard without having been entered for exhibition, the owner shall be liable to a fine of £2 and to the forfeiture of any prize awarded to him or her.

15. All Live Stock (see Conditions 2, 13 and 38 for exceptions with regard to Horses) must remain in their places in the Show Yard until after six o'clock in the afternoon of the last day of the Show, and shall under no circumstances be taken out of their places in the interval without the special permission of the Stewards.

16. During the time the Show is open to the public no rug or cloth shall be hung up so as to conceal any animal in a horse-box or stall, except with the special permission of the Steward of the department. All sheets used for the purpose must be removed before 9 o'clock on each day the exhibition is open to the public, and must not be replaced until after the closing hour of the Show each day.

17. All Exhibits and all persons in charge of the same, will be subject to the Orders, Regulations, and Rules of the Society, and the Stewards shall have the power to remove from the Yard the Stock or property belonging to, and to cancel the admission ticket of, any Exhibitor who shall infringe any of the Regulations or Conditions of the Meeting, or who shall refuse to comply with any instructions given by the Stewards, without any responsibility attaching to the Stewards or the Society in consequence of such removal.

18. No animal shall be decorated with colours other than the Society's Prize Rosettes.

19. No person shall be allowed to fix any placard, or to take down any official placard, in the Yard, without the written permission of the Stewards.

20. All persons in charge of Exhibits will be subject to the orders of the Stewards, and will be required to parade or exhibit the animals in their charge at such times as may be directed by the Stewards. Servants must be in attendance each day during the Show at least a quarter of an hour before the time appointed for exhibiting the animals under their charge in the Show rings. Servants in charge of animals must see that the animals' boxes or stalls are kept clean. No oil or cooking stove of any description must be lighted in the Horse Boxes and any one found offending in this respect will be dealt with in accordance with Regulation 33. Owners of animals exhibited will be held responsible for the behaviour of their Servants, and for the consequences of any misconduct of such Servants.

21. Servants in charge of Stock at night must, if they leave the yard, return before 10 p.m., or they will not be admitted.

22. On the day previous to the opening and on each day of the Show hay or green food and straw will be supplied by the Society free of expense to exhibitors at the Forage Stores in the Show Yard. Servants must apply at the Forage Stores for their Forage Tickets after they have brought their animals into the Yard. Corn, meal, and cake can be obtained in the Show Yard at fixed prices.

NOTE.—For the convenience of Exhibitors wishing to sell their animals, a Register will be kept at the Secretary's Office, in which they may enter the prices.

TICKETS.

23. Each Exhibitor of Live Stock whose entry fees amount to £1 and upwards will have a Free Ticket of admission to the Show Yard sent to him, except in the case of a Member, who will receive his Member's Badge in lieu of an Exhibitor's Ticket. Tickets for the use of Servants in charge of Live Stock remaining in the Yard will also be sent, and the Exhibitor will be held responsible for the proper use of such Tickets. In the case of animals not having a box in the Yard, a Servant's Ticket will not be required as the official label will admit the Driver or Rider, Horse and Vehicle into the Yard. In case of transfer or other improper use of a Ticket the Exhibitor will be required to pay a fine of £1 for each case. Exhibitors will be held responsible for the attendance at each Parade of as many Servants as Tickets have been issued for.

RESPONSIBILITY.

24. Neither the Society nor any of its Officers or Servants shall be in any way responsible or accountable for anything that may happen (from any cause or circumstance whatever) to Exhibitors or their Servants, or to any animal or article exhibited, or property brought into the Show Yard, or otherwise for anything else in connection with, or arising out of, or attributable to, the Society's Show, or these or any other Conditions or Regulations prescribed by the Society in relation thereto.

25. Each Exhibitor shall be solely responsible for any consequential or other loss, injury, or damage done to, or occasioned by, or arising from, any animal or article exhibited by him, and shall indemnify the Society against all legal or other proceedings in regard thereto.

26. The Society, its Officers and Servants, will not be liable for any errors or mistakes that may happen in placing or penning the Stock or Articles to be exhibited, but the Servants in charge of the same must see that they are placed or penned according to their entries.

DISQUALIFICATION.

27. The use of resin, soap, sawdust above the knee, or other substances designed to give an artificial appearance; cording; or other improper means adopted in showing an animal in the Agricultural Horse Classes will be regarded as a disqualification.

28. No animal which has been exhibited as Fat Stock at any Show shall be eligible to compete for the Prizes offered in this Prize Sheet.

29.—An animal in the Breeding Classes having any unsoundness likely to be transmitted to its progeny shall be disqualified thereby from receiving any Prize offered by or through the Society.

30. If it shall be proved to the satisfaction of the Stewards or Council that an Exhibitor or Competitor has knowingly signed an incorrect Certificate, or knowingly given an incorrect Pedigree of any animal, or has attempted to enter an animal or other exhibit or to obtain a Prize by any other unfair means at this or any other Agricultural Society's Meetings, or is under exclusion from any Breed Society for fraudulent practices, the Council shall have the power to cancel all awards made to such Exhibitor or Competitor; to disqualify him or her from exhibiting or competing at future Meetings of the Society, and to inform other Agricultural Associations of their action in this respect.

PENALTIES.

31. As the non-exhibition of animals entered for the Show causes unnecessary preparations and expense, and disarranges the Show Yard, any person entering Stock, and failing to exhibit the same, shall pay a penalty of 10s. for each entry, unless a Certificate, under the hand of the Exhibitor or his authorised agent, be lodged with the Secretary of the Society, before the day of exhibition, certifying that such non-exhibition is caused either by—(1) the death of the animal or animals; or (2) contagious or infectious disease (confirmed by the explanatory certificate of a Veterinary Surgeon) or other sufficient cause; or (3) by its becoming ineligible for the Class in which it has been entered. The fine is not remitted in the case of an exhibitor selling an animal between the time of entry and the date of the Show.

32. Every Exhibitor will be required to undertake to forfeit and pay to the Society the sum of £20, as and for liquidated damages, if any animal which he exhibits be, to his knowledge, suffering from any contagious or infectious disease, and the Stewards are empowered to prevent the entry of any diseased animal into the Yard, or to have it removed therefrom.

33. Any infringement of any of these or any other prescribed Regulations or Conditions will subject the Exhibitor to a fine of £1 by the Stewards, and to the forfeiture, by order of the Council, of any prize to which he may be entitled (in addition to all other consequences attaching to such infringement). The Council reserves to itself the right to inform other Agricultural Associations of any decision it may come to with respect to an Exhibitor.

AWARDS.

34. The Society reserves to itself the right to withhold any prize, if, in the opinion of the Stewards, the conditions and regulations have not been properly complied with, or if, in the opinion of the Judge, there is insufficient merit.

35. Only the signed awards of the Judges are accepted by the Society as evidence that a prize has been awarded, and the production of the prize card or the rosette by an Exhibitor will not entitle him to the prize.

36 The certificate of the Veterinary Inspector, whether as to age or soundness, shall be required only in cases where the Judges are in doubt, or where the Stewards may consider it necessary. (See also Regulation 46 with reference to Stallions and Mares.) The decision of the Inspector in such cases shall be final and conclusive; and in case it shall be against the animal to which a Prize has been awarded, such animal shall be disqualified from receiving such Prize.

PROTESTS.

37. Any Exhibitor wishing to lodge a protest having reference to Live Stock exhibited at this meeting must make the same in writing on a form to be obtained from the Secretary, and deposit with him the sum of £3. If on investigation the protest is not sustained to the satisfaction of the Stewards, the sum thus deposited shall, at the discretion of the Council, be forfeited to the funds of the Society. All protests (except in the Any Agricultural, Harness, Saddle or Jumping Classes) must be delivered at the Secretary's Office in the Show Yard on the day on which the award is made, and no protest will be SUBSEQUENTLY received, unless a reason satisfactory to the Stewards be assigned for the delay. Any protest against an award in the Any Agricultural, Harness, Saddle or Jumping Classes must be made to the Steward in the ring immediately after the judging of the class to which it refers, and a deposit of £3 must, at the same time, be handed to the Steward. The Stewards will consider such protests at 11 o'clock on the following day at the Secretary's Office, at which time and place any person making a protest must attend or be represented by his authorised agent. The decision of the Stewards shall be final.

APPLYING TO CERTAIN CLASSES ONLY.

HORSES.

38. Horses can be removed from the Yard at night on deposit by the Exhibitor of £3 at the Finance Office, which sum will be forfeited if the Horse does not return at 8 a.m. each day during the Exhibition. This regulation does not apply to Animals not having a box in the Yard entered in the Any Agricultural, Harness, Saddle and Jumping Classes only.

39. Exhibitors must provide saddles for Horses in Classes 14 to 18, 27 to 35, and 46 to 55, as they are to be ridden; and vehicles and harness for those in classes 36 to 45, which are to be driven.

40. No Horse, unless a Foal, will be admitted into the ring without a proper bit.

41. The Prizes for Stallions foaled before 1922 will be withheld until a certificate from the owner is delivered to the Secretary that the Horse has served at least 10 Mares during the current season.

42. All Foals must be the offspring of the Mares with which they are exhibited, and the name of the Sire of the Foal must be stated on the certificate of entry.

43. Mares entered as in Foal shall, except as otherwise stated hereafter, be certified to have produced a living Foal before August 1st of the year of the Show. If the required certificate, which must be on a form obtainable from the Secretary, is not received by September 30, 1924, the prize awarded will be forfeited.

44. Horses may, at the discretion of the Stewards, be measured, and the measurement shall be taken in the shoes worn by the entry at the time of judging, and these shoes shall not be removed to allow of the entry being shown in another class.

45. In the Harness Classes for Hackneys exceeding 14 hands (except yearling colts and fillies) no shoe (nails included) may exceed 2 lbs. in weight, and for Ponies not exceeding 14 hands, yearling colts and yearling fillies, no shoe (nails included) may exceed 1¼ lbs. in weight.

46. All Stallions and Mares (yearlings and foals excepted) to which prizes have been awarded in the breeding classes shall be examined by the Society's Veterinary Inspector, and unless pronounced free from indications of hereditary disease shall be ineligible to receive the prize. The owner of an Animal rejected under this Regulation may, upon his application in writing to the Secretary, be furnished with a copy of the Veterinary Certificate. This Regulation shall not, however, apply to any animal holding a Ministry of Agriculture Certificate for the current year, which must accompany the animal and be available for inspection by officers of the Society.

47. The following special conditions apply only to the Medal offered by the Shire Horse Society, viz.: the owner of the animal entered to have been a Member of the Bath and West and Southern Counties Society, for not less than six months previous to March 31, 1924; a Mare five years old, or upwards must produce a Foal in the current year, or have had a Foal in the preceding year; in the case of in-foal Mares a certificate of foaling must be lodged with the Secretary of the Shire Horse Society before the medal will be despatched. No animal to compete which has won the Shire Horse Society's Gold Medal during the current year; the Royal and London Shows being excepted; the winning animal to be entered, or eligible for entry, in the Shire Horse Society's Stud Book; and a certificate that the winner is free from hereditary disease signed by the Society's Veterinary Inspector after his examination on the Show Ground, must be lodged with the Secretary of the Shire Horse Society, but Stallions licensed by the Ministry of Agriculture, and Stallions, Mares and Fillies passed at the London Show, shall be exempt from further examination when selected for Medals during the current year. A prize of £5 will also be awarded to the breeder of the animal winning the Medal, provided that he is a member of the Shire Horse Society, and that the Dam is a Mare registered in the Shire Horse Stud Book. All awards must be completed within six months of the date upon which the Medal was awarded, or they will be void. The Council reserves the right to award the prizes only to persons approved by the Shire Horse Society and subject to confirmation in the uncontrolled discretion of the Council.

48. The following special conditions apply only to the Medal offered by the Hunters' Improvement and National Light Horse Breeding Society for Hunter Brood Mares, viz.:—The Mare awarded the Medal must possess a certificate of soundness from hereditary disease, signed by the Bath and West Society's appointed Veterinary Inspector, who must be a member of the Royal College of Veterinary Surgeons, after his examination of the animal on the Show Ground. Any Hunter Brood Mare, 8 years old or over, having been either awarded one of the Society's Gold Medals since 1910, or selected as Reserve for same, or having been passed sound after January 1, 1911, by a Veterinary Surgeon appointed by the Hunters' Improvement and National Light Horse Breeding Society, shall be exempt from further examination upon the owner producing at the time of exhibition the official veterinary certificate issued by the Secretary of that Society.

49. The following special conditions apply only to the Medal offered by the Hunters' Improvement and National Light Horse Breeding Society for best Mare or Gelding of any age exhibited in the Riding Classes. The Hunter awarded the medal must possess a certificate of soundness from hereditary disease, signed by the Bath and West Society's Veterinary Inspector, who must be a member of the Royal College of Veterinary Surgeons, after his examination of the animal on the Show Ground. The selected Mare, if unregistered, or the selected Gelding, if unentered, must be registered or entered within a month of the award in the Hunter Stud Book. No animal may take more than one of

these medals in 1923. The Judge, in awarding the Medal, is instructed to give preference to animals showing weight-carrying properties.

NOTE.—No awards of the above-named Society's Prizes or Medals to a Hunter named and registered in the Hunter Stud Book and subsequently entered by the owner under another name, will be recognised or confirmed unless a re-entry has been previously lodged by the owner for the Hunter Stud Book and the new name registered by the Society.

50. The following special conditions apply only to the Silver Medal offered by the Hackney Horse Society in the Harness Classes. All horses competing for the Medal must *be by a Registered Hackney Sire.* All Geldings must be registered in the Stud Book. A Certificate signed by the Breeder of any unregistered mare must be forwarded to the Secretary of the Hackney Horse Society before the Medal is despatched. Each animal must be examined by a qualified Veterinary Surgeon on the Show ground, and a Certificate of Soundness must be supplied. The Medal must be open to all Classes, and not confined to local competition, and the name and number of the sire, and the name and address of the breeder of each animal should appear in the Catalogue. No animal can take more than one of the Silver Harness Medals in any one year.

51. The Jumping Competitions will be carried out in accordance with, and judged under the rules of, the Show Jumping Association. The jumps may consist of single hurdle, gate, double hurdle, bank, wall, and water, at the discretion of the Judge and Stewards. Each horse competing shall have its catalogue number affixed in such a way as to be easily seen by the general public.

CATTLE.

52. All cattle must be properly secured to the satisfaction of the Officers of the Society on being brought to the gate of the Yard, or they will not be admitted. All Bulls must have a ring or clamp attached to the nose and, in the aged Classes, must be provided with a strong chain, and be led with a proper stick.

53. All cattle will be required to be paraded in the ring at least once a day at the discretion of the Stewards.

54. No Bull calved before January 1st, 1922, or in the Aberdeen-Angus Classes before December 1st, 1921, will be eligible to receive a Prize until certified to have served not less than six different Cows (or Heifers) previous to June 1st, 1924, and to be the sire of live calves dropped in the year 1924, or in the Aberdeen-Angus Classes after December 1st, 1923.

55. No Cow or Heifer, entered as in-milk, will be eligible to receive a Prize unless certified to have had a living Calf within the fifteen months preceding the date of the Show, or that the Calf, if dead, was born at the proper time.

56. Every Cow or Heifer in-milk shall be milked dry in the Show Yard by 7.30 p.m. on the evening preceding the day of judging, in the presence of an officer of the Society appointed for the purpose.

57. Any animal in the Cattle Classes found to be artificially coloured will be disqualified.

58. The milk yielded by Cows in the Show Yard must not be sold at the stalls, but will be purchased by the Society for the purposes of the Dairy at a price to be agreed upon, and will be paid for on delivery at the Milk Receiving Office in the Dairy.

59. The following conditions apply only to the prizes offered for Pedigree Dairy Shorthorn and Devon Milking Cows :—The Cows and Heifers entered will be clean milked out at 6 o'clock on the evening preceding the opening of the Show to the satisfaction of the Stewards, and will be again milked in the ring on the first morning of the Show in the presence of the Judge, who shall see the Milk

weighed, and any animal not yielding up to the following standard will not be awarded a prize. Ages of Shorthorn cows to be calculated to the date on which the cow or heifer produced her last calf :—

	Having Calved within 2 calendar months of the 1st day of the Show.		Having calved between 2 and 3 calendar months of the 1st day of the Show.		Having calved more than 3 calendar months of the 1st day of the Show.	
	lbs. of milk.		lbs. of milk.		lbs. of milk.	
	Shrthns.	Dvns.	Shrthns.	Dvns.	Shrthns.	Dvns.
Cows, 5 years and upwards ..	30	22	27	21	24	18
Cows, 4 years and under 5 years..	26	20	23	20	20	17
Cows or Heifers, 3 years and under 4 years	22	18	19	17	16	14
Heifers, under 3 years old	18	15	15	13	12	10

60. The following conditions shall apply only to the prizes offered for Pedigree Dairy Shorthorn Bulls and Heifers in Classes 78 & 80:—No Bull is eligible to compete unless it has been registered or accepted for registration in the Year Book of the Dairy Shorthorn Association The dam and sire's dam of the Animals entered to have received, in or before 1918, a Certificate of Merit in Milking trials or tests recognised by the Dairy Shorthorn Association, or in an inspection class confined to Pedigree Dairy Shorthorns where the standard weight of milk has been a necessary qualification, or to hold a yearly record, published in the Association's Year Book, up to mid-day, October 1st, 1919, or after that date a record within 315 days after calving (published or accepted as eligible for publication as follows) :—(1) Cows, 4 years old and upwards at date of calving, 8,000lbs. ; (2) Cows, over 3 years old and under 4 years old at date of calving, 6,000lbs. ; (3) Heifers, 3 years old and under at date of calving, 5,000lbs. No Bull or Cow having taken one of the Association's Prizes is eligible to compete again the same year, except at the R.A.S.E. Show. The prizes in this class will not be awarded unless there are at least three individual exhibitors. A certificate from the Dairy Shorthorn Association stating that the Bull is entered in their Register must be furnished by the exhibitor at the time of making the entry.

61. In the Kerry and Dexter Classes clipping (except in the case of a few hairs on the top of the tail) will disqualify an animal.

62. The following conditions apply to animals entered in the Milk and Butter Test Classes :—The date of last calving must be given on the entry form and, when an animal calves between the date of entry and that of the Show, notice of such calving must be sent to the Secretary or the animal may be disqualified. Points for Lactation will be allowed as follows :—One point for every completed 10 days since calving, calculated to the first day of the show, deducting the first 40 days. Maximum lactation points 12.

63. Except in Local and Dairy Classes, every animal entered for competition must be entered, or certified as eligible to be entered, in the Herd Book of its Breed, where such Herd Book exists and has been in existence for not less than seven years, and all cattle must be tattooed in accordance with the rules of their respective Breed Societies, where such rules exist. Where an animal is entered by the Exhibitor as eligible for entry in the Herd Book of its breed, proof of such eligibility must be furnished to the Secretary at the time of making the entry.

SHEEP.

64. Each pen of Ewes must be of the same Flock.

65. The following conditions apply to the Medal offered by the Southdown Sheep Society:—The sheep competing must be entered or eligible for entry in the Flock Book, and there must be at least three competitors.

66. Except in Local Classes every animal entered for competition must be entered or certified as eligible to be entered, in the Flock Book of its Breed, where such Flock Book exists and has been in existence for not less than seven years, and all Sheep must be tattooed in accordance with the rules of their respective Breed Societies where such rules exist. Where an animal is entered by the Exhibitor as eligible for entry in the Flock Book of its breed, proof of such eligibility must be furnished to the Secretary at the time of making the entry.

PIGS.

67. All Sows farrowed before 1924 shall be certified to have had a litter of live Pigs within six months preceding the first day of exhibition, or to be in-Pig at the time of entering, so as to produce a litter of Pigs, farrowed at their proper time, before the 1st of September following. In the case of in-Pig Sows the Prize will be withheld until the Exhibitor shall have furnished the Secretary with a certificate of farrowing as above. If the required Certificate, which must be on a form obtainable from the Secretary, is not received on or before the 15th September following, the prize awarded will be forfeited.

68. All Pigs exhibited with a Sow shall be her own produce, of the same litter, and not exceeding two months old at the time of the Show.

69. No Sow above 18 months old that has not produced a litter of live Pigs shall be eligible to compete in any of the Classes.

70. Any animal in the Pig Classes found to be artificially coloured will be disqualified.

71. Should any question arise as to the age of any exhibit in the Pig Classes, the Stewards shall at the request of the Judge, have the state of their Dentition examined by a competent authority. If the state of the Dentition shall indicate that the age of any of the Pigs does not agree with the Dentition Test, the Stewards shall report the same to the Council, who shall have power to disqualify such Pig or Pigs. The following is the state of Dentition in Pigs which will be considered as indicating that they exceed the ages specified below:—Six Months: Pigs having their corner permanent incisors cut will be considered as exceeding this age. Nine Months: Pigs having their permanent tusks more than half up, will be considered as exceeding this age. Twelve Months: Pigs having their central permanent incisors up, and any of the three first permanent molars cut, will be considered as exceeding this age. Fifteen Months: Pigs having their lateral temporary incisors shed, and the permanents appearing, will be considered as exceeding this age. Eighteen Months· Pigs having their lateral permanent incisors fully up will be considered as exceeding this age.

72. Except in the Local Classes, every animal entered for competition must be entered or certified as eligible to be entered in the Herd Book of its breed, where such Herd Book exists and has been in existence for not less than seven years and must conform to the rules of their respective Societies. In the Berkshire classes the exhibits must be entered or accepted for entry in the British Berkshire Herd Book and in the Large Black Classes the official ear-marker bearing the Herd Book number must be in the ear of all pigs entered, and the Judges will be instructed not to award prizes unless this regulation is observed, or a reasonable explanation given for the absence of the marker.

GOATS, CIDER, POULTRY, DAIRY PRODUCE, BUTTER-MAKING,

MILKING AND SHOEING COMPETITIONS.

For Conditions and Regulations see entry form.

ADJUDICATION OF PRIZES

73. The Judges are instructed as follows, and entries are received subject to this :—

a. Not to award any Prize or Commendation unless the entry possesses sufficient merit.

b. Not to award a Prize to any Horse or Mare in the Breeding Classes, unless it is free from unsoundness likely to be transmitted to its progeny ; or if a Gelding, unless free from unsoundness ; in either case, an accident having temporary consequences only excepted, and in awarding the Hunters' improvement Society's Medals to give preference to animals showing weight-carrying properties.

c. In awarding Prizes to Cattle, Sheep, and Pigs, to decide according to the relative merits of the animals for Breeding purposes, and not to take into consideration their present value to the butcher.

d. To make the milking capacity and form of udder one of the chief points in awarding prizes to Cows and Heifers in milk.

e. To draw the attention of the Stewards to any exhibit that has been improperly prepared for exhibition or is wrongly entered.

f. To give in a "RESERVE NUMBER" in each Class, indicating the animal or exhibit which in their opinion possesses sufficient merit for the Prize, if the animal or exhibit to which the Prize is awarded should become disqualified. Should the "Reserved Number" succeed to a prize, and be itself disqualified, the prize will be forfeited.

g. Immediately after the Judging to deliver to the Stewards their signed awards stating the numbers to which the Prizes are adjudged, and noting all disqualifications.

74. Should any question arise upon which the Judges may desire a further opinion, the Stewards shall provide them with a Referee.

PAYMENT OF PRIZES.

75 Cheques for the Prizes awarded (except where further qualification of an animal is required) will be drawn at the meeting of the Finance Committee held in July, 1924, and will then be forwarded by post to the Exhibitors to whom they have been awarded.

INTERPRETATION OF CONDITIONS.

76. The Society reserves to itself by its Council the sole and absolute right to interpret these or any other prescribed conditions and regulations, or Prize Sheets, and to arbitrarily settle and determine all matters, questions or differences in regard thereto, or otherwise arising out of or connected with or incident to the Show. Also to refuse and to cancel any entries, disqualify Exhibitors, prohibit exhibition of entries, vary or cancel awards of prizes or reserved numbers, and relax conditions, as the Society may deem expedient.

POULTRY.

(Under Poultry Club Rules).

Entry Fees: Class 1, Members, 4/-; Non-Members, 6/-; Other Classes, Members, 3/-; Non-Members, 4/- each entry.

Judges—A. G. PITTS, Berrow, Burnham-on-Sea -Classes 1 to 22, 49 to 54 and 61 to 64), and W. BRENT, Brentholin, Callington, Cornwall -(Classes 1, 23 to 48 and 55 to 70).

The Birds in Classes 1 *to* 48 *must have been hatched previous to January* 1*st*, 1924.

Class.		First Prize. £	s.	Second Prize. £	s.	Third Prize £	s
1.	—Any Two Pure Breeds, best mated to cross for producing Table Poultry.—Cock and 3 Hens, bred in 1922 or 1923, the property of one Exhibitor..	3	0	2	0	1	0
2.	—COCHIN or BRAHMA—Cock	1	0	0	15	0	10
3.	—Ditto—Hen	1	0	0	15	0	10
4.	—PLYMOUTH ROCK (Barred)—Cock	1	0	0	15	0	10
5.	—Ditto—HEN	1	0	0	15	0	10
6.	—Ditto (Any other variety)—Cock	1	0	0	15	0	10
7.	—Ditto—Hen	1	0	0	15	0	10
8.	—ORPINGTON (Black)—Cock	1	0	0	15	0	10
9.	—Ditto—Hen	1	0	0	15	0	10
10.	—Ditto (Any other variety)—Cock	1	0	0	15	0	10
11.	—Ditto—Hen	1	0	0	15	0	10
12.	—MINORCA—Cock	1	0	0	15	0	10
13.	—Ditto—Hen	1	0	0	15	0	10
14.	—RHODE ISLAND RED—Cock	1	0	0	15	0	10
15.	—Ditto—Hen	1	0	0	15	0	10
16.	—SUSSEX (Light)—Cock	1	0	0	15	0	10
17.	—Ditto—Hen	1	0	0	15	0	10
18.	—SUSSEX (Any other variety) Cock	1	0	0	15	0	10
19.	—Ditto—Hen	1	0	0	15	0	10
20.	—DORKING (Any variety)—Cock	1	0	0	15	0	10
21.	—Ditto—Hen	1	0	0	15	0	10
22.	—LANGSHAN—Cock or Hen	1	0	0	15	0	10
23.	—WYANDOTTE (White)—Cock	1	0	0	15	0	10
24.	—Ditto—Hen	1	0	0	15	0	10
25.	—Ditto (Coloured)—Cock	1	0	0	15	0	10
26.	—Ditto—Hen	1	0	0	15	0	10
27.	—Ditto (Any other variety)—Cock	1	0	0	15	0	10
28.	—Ditto—Hen	1	0	0	15	0	10
29.	—LEGHORN (White)—Cock	1	0	0	15	0	10
30.	—Ditto—Hen	1	0	0	15	0	10
31.	—Ditto (Any other colour)—Cock	1	0	0	15	0	10
32.	—Ditto—Hen	1	0	0	15	0	10
33.	—CAMPINE—Cock	1	0	0	15	0	10
34.	—Ditto—Hen	1	0	0	15	0	10
35.	—HAMBURG (Any variety)—Cock	1	0	0	15	0	10
36.	—Ditto—Hen	1	0	0	15	0	10
37.	—OLD ENGLISH GAME (Black Red)—Cock	1	0	0	15	0	10
38.	—Ditto—Hen	1	0	0	15	0	10
39.	—Ditto (Any other colour)—Cock	1	0	0	15	0	10
40.	—Ditto—Hen	1	0	0	15	0	10

POULTRY—*continued.*

	First Prize £	Second Prize £	Third Prize £
41.—Indian Game—Cock	1 0	0 15	0 10
42.—Ditto—Hen	1 0	0 15	0 10
43.—French (including Faverolles)—Cock	1 0	0 15	0 10
44.—Ditto—Hen	1 0	0 15	0 10
45.—Ancona—Cock	1 0	0 15	0 10
46.—Ditto—Hen	1 0	0 15	0 10
47.—Any Other Distinct Breed not previously mentioned (excluding Bantams)—Cock	1 0	0 15	0 10
48.—Ditto—Hen	1 0	0 15	0 10

SELLING CLASSES.

	First Prize £	Second Prize £	Third Prize £
49.—Any Distinct Breed—Cock or Cockerel (Price not to exceed £1 1s.)	1 0	0 15	0 10
50.—Any Distinct Breed—Hen or Pullet (Price not to exceed £1 1s.)	1 0	0 15	0 10

CHICKENS OF 1924.

	First Prize £	Second Prize £	Third Prize £
51.—Cochin, Brahma, Plymouth Rock, Orpington, Langshan, Sussex or Dorking—Cockerel	1 0	0 15	0 10
52.—Ditto—Pullet	1 0	0 15	0 10
53.—Minorca, Wyandotte, Leghorn, Campine, Hamburg, Faverolles or French—Cockerel	1 0	0 15	0 10
54.—Ditto—Pullet	1 0	0 15	0 10
55.—Game, Malay, or any other Distinct Breed not previously mentioned—Cockerel	1 0	0 15	0 10
56.—Ditto—Pullet	1 0	0 15	0 10

LIVE TABLE POULTRY.

	First Prize £	Second Prize £	Third Prize £
57.—Pair of Cockerels of any Pure Breed, hatched in 1924	1 0	0 15	0 10
58.—Pair of Pullets of any Pure Breed, hatched in 1924	1 0	0 15	0 10
59.—Pair of Cross-bred Cockerels, hatched in 1924	1 0	0 15	0 10
60.—Pair of Cross-bred Pullets, hatched in 1924	1 0	0 15	0 10

UTILITY POULTRY.

	First Prize £	Second Prize £	Third Prize £
61.—Light Breed—Cock	1 0	0 15	0 10
62.—Ditto—Hen	1 0	0 15	0 10
63.—Heavy Breed—Cock	1 0	0 15	0 10
64.—Ditto—Hen	1 0	0 15	0 10

SPECIAL PRIZES.

Offered by the Poultry Club.

BATH AND WEST AND SOUTHERN COUNTIES CUP (Value £10 10s.)

For the Best Bird in the Show, the property of a Member of the Poultry Club. The Cup to be won three times, not necessarily in succession, by the same exhibitor before becoming his absolute property.

A Silver Medal for best Cock or Cockerel in the Poultry Classes, the property of a Member of The Poultry Club.

„ „ „ Hen or Pullet, ditto, ditto.

POULTRY—*continued.*

The Associated Society's Bronze Medal for the Best Bird in the Show (Winner need not be a Member of The Poultry Club, but must be a Member of the Bath and West and Southern Counties Society).

Offered by Mrs. Cavill, Wimpenny Farm, Kingston, Taunton.

A Silver Medal for the best Bird in Class 61 or 62.

A Silver Medal for the best Bird in Class 63 or 64.

Class.	DUCKS, GEESE AND TURKEYS.	First Prize. £		Second Prize. £		Third Prize. £	
65.—	Drake or Duck (Aylesbury)	1	0	0	15	0	10
66.—	,, ,, (Rouen)	1	0	0	15	0	10
67.—	,, ,, (Indian Runner)	1	0	0	15	0	10
68.—	,, ,, (Any other variety)	1	0	0	15	0	10
69.—	Gander or Goose	1	0	0	15	0	10
70.—	Turkey—Cock or Hen	1	0	0	15	0	10

POULTRY.

(Under Poultry Club Rules.)

CONDITIONS AND REGULATIONS.

CHARGES, &c.

1. Exhibitors may make an unlimited number of Entries on payment of fees as follows :—

	MEMBERS.		NON MEMBERS.	
	s.	d.	s.	d.
For each entry (Class 1)	4	0	6	0
,, (other Classes)	3	0	4	0

The above fees include coops, food, and attendance.

N.B.—The above fees *must* be sent with the entries, or no notice will be taken of the latter.

2. The privilege of entering at Member's fees is strictly limited to Members of the Bath and West Society, or of the Swansea Horse Show Society elected on or before January 31, 1923, and subscribing not less than £1 annually.

3. All entries must be made on the printed forms to be obtained of the Secretary (F. H. STORR, 3, Pierrepont Street, Bath), and such forms must be correctly filled up and returned to the Secretary, together with all fees due, on or before April 21. Exhibitors are requested to carefully examine the List of Prizes and Conditions, as the Society cannot be responsible for any errors made by Exhibitors in the entry forms, and birds entered in a wrong Class will be necessarily excluded from competition. No alterations can be made in entry forms after they have been received by the Secretary.

4. The Council reserve the right to refuse the entries of any person.

5. Exhibitors must state the price and breed of their birds on their entry forms.

SHOW YARD.

6. All birds must be in the Show Yard by 6 p.m. on *Wednesday, May* 16, and no bird can be removed before 7 p.m. on *Tuesday, May* 22. Any Exhibitors who send for their birds must do so between 7 and 8 p.m. on that day.

7. All carriage must be prepaid to Swansea Railway Station, otherwise the birds will not be received at the Exhibition ; but they will be conveyed free of expense from the Station to the Show Yard and back.

8. No Exhibitor or Servant will be allowed into the tent until the birds have been judged.

9. The Poultry Tent will not be open to the public until 2 o'clock on the first day of the Exhibition.

10. A Non-Transferable Admission Ticket for the Exhibition will be sent to each Exhibitor whose entry fees amount to £1 and upwards.

TABLE POULTRY.

11. In these Classes (57 to 60 and 67 to 71), quality for the table will be considered before mere weight. The date of hatching must be given and, in the case of cross bred birds, the breeds of the parents.

12. In Classes 67 to 71 the Birds must be sent killed and plucked. They will be withdrawn from exhibition when considered necessary, and, if unsold, will be

returned to Exhibitors after 6 p.m. on Saturday, May 19. Exhibitors are recommended to put a reasonable price upon their exhibits in these Classes so as to promote the sale of them.

SALES.

13. All birds may be claimed, at the price put upon them, any time after 4 o'clock on Thursday, May 17, and a sale *must take place* if the price stated be paid to the Clerk in the Poultry Office at the time of claiming. *No alteration can be made in the prices stated on the entry forms* and in the Catalogue until after Saturday, May 19, when the price may be reduced on payment to the Steward of one shilling per pen on each alteration. Birds must be *sold in pens*, and the price stated must include the basket. Birds entered in selling classes must be sent in separate hampers. A charge of 10 per cent. will be made for all birds sold. The persons who have the management of the sales cannot take charge of birds which are disposed of privately.

AWARDS.

14 No second prize will be given in any of the Classes unless there are three entries, and no third prize unless there are six entries.

DISQUALIFICATION.

15. The Judges are empowered to withhold a prize or prizes where the birds are not considered of sufficient merit, or in the chicken classes where they consider them over age, and are instructed to disqualify any that have been clipped, drawn, trimmed, marked, or dyed. In the Game Classes birds can be shown either dubbed or undubbed.

16. An Exhibitor detected in a false statement as to the age, etc., of any bird, or in any other practice calculated to deceive or mislead the Judges or Stewards, shall forfeit all or any prizes awarded to him or her at the Show, and will be disqualified from competing at any future Show of the Society, and the Council shall have power to inform other Societies of their action in this respect.

17. No person who shall have been shown to the satisfaction of the Council to have been excluded from exhibiting for Prizes at the exhibition of any other Society in consequence of having attempted to obtain a Prize by giving a false Certificate, or by other unfair means, and no person who is under exclusion from any Breed Society for fraudulent practices, shall be allowed to exhibit at this or any other Meeting of the Society.

18. Unhealthy birds will not be exhibited, but will be immediately returned to their owners, and the fees will be forfeited.

PROTESTS.

19. In order to check frivolous and vexatious protests, no protest will be entertained unless accompanied by a deposit of £1 in each case; and in case the protest is not substantiated the deposit may be forfeited to the Funds of the Society. All protests must be made before 12 o'clock (noon) on Friday, May 18.

FORFEITS.

20. Persons entering birds and failing to send the same to the Exhibition will forfeit the entrance fee for each pen so left vacant.

GENERAL.

21. All birds shown must be *bona fide* the property of the Exhibitor.

22. For each pen entered the Exhibitor will receive a label, on the reverse side of which he must legibly write his name and address for the return journey.

23. All eggs laid at the Exhibition will be destroyed.

24. The Stewards pledge themselves to take every care of the birds exhibited, but neither they nor the Society will, in any case, be responsible for any accident loss or damage, from whatever cause arising, the exhibits being entered at the sole risk of the Exhibitors, and Exhibitors will be required to hold the Society harmless in the event of loss.

25. In case of death of any bird during the Exhibition, it will be sent back for the inspection of the Exhibitor.

26. The Poultry Department is subject to the Rules and Regulations of the Society and its officers.

⁂ *The use of properly-constructed Poultry Baskets will facilitate the safe and speedy conveyance of the birds to and from the Exhibition and all Birds entered in selling Classes must be sent in separate hampers.*

The Society cannot, under any circumstances, undertake to send telegrams to Exhibitors as to Judges awards.

Applications for Catalogues and printed lists of awards should be made only to the Publishers, MESSRS. W. LEWIS & SONS, *Herald Office, Bath.*

By order of the Council.

3, *Pierrepont Street, Bath.* **F. H. STORR,** *Secretary.*

TELEGRAPHIC ADDRESS:—"AGRICULTURE, BATH."
TELEPHONE No 610.

FINANCIAL STATEMENTS

FOR

1923

WITH ITEMS OF 1922 *FOR COMPARISON.*

PAGES

Summary of Cash Account ... ... clvi-clvii

Annual Cash Account ... ... clviii-clxvii

Assets and Liabilities Account clxviii

Financial Result of Show clxix

The Bath and West and
SUMMARY OF THE CASH ACCOUNT
WITH COMPARATIVE

Cr.

Page of accompanying Cash Account.	RECEIPTS.	£ s. d.	1923. Swansea. £ s. d.	£ s. d.	1922. Plymouth. £ s. d.
	General :-				
clviii	Dividends and Interest		931 2 10		813 7 6
,,	General		0 1 0		0 1 0
,,	Subscriptions from Members . . .		1,142 15 0		1078 16 0
,,	Life Members		45 0 0		20 0 0
,,	Journal		65 17 0		62 6 11
				2,184 15 10	1,974 11 5
	Show :-				
clx	Implements		2,981 16 6		3,180 17 11
,,	Horses	1,269 16 0			1,319 4 0
,,	Cattle, Sheep, Goats and Pigs	2,080 16 8			2,104 8 0
,,	Catalogues, Fodder, &c. .	127 15 5			123 17 11
			3,428 8 1		3,547 9 11
clxii	Poultry		96 7 0		81 18 6
,,	Shoeing		33 18 0		39 10 0
,	Timbering and Splicing -		16 16 0		
,,	Small Holdings and Allotments . . .		- - -		54 3 0
clxiv	Cheese and Butter		80 5 6		92 1 2
,,	Working Dairy		156 2 8		180 9 7
,,	Cider		12 19 6		6 3 6
,	Admissions		13,752 6 3		8,136 5 0
clxvi	Unapportionable :—				
	Contract Premiums and Cloak Rooms	680 2 4			569 15 2
	Sales and Fittings . .	664 7 9			717 12 8
	Local Committee for Police	157 10 0			- - -
			1,502 0 1		1,287 7 10
,,	Subscription from Swansea Local Committee .				800 0 0
				22,060 19 7	17,406 6 5
				24,245 15 5	19,380 17 10
	Timber in hand from Plymouth Show . .			622 3 10	6,752 6 0
	Deposit returned			8,000 0 0	3,500 0 0
	Balance in Bank, January 1st . . .			732 18 5	
				£33,600 17 8	29,633 3 10

Southern Counties Society.

FOR THE YEAR ENDING DEC. 31ST, 1923.

STATEMENT FOR 1922. DR.

Page of accompanying Cash Account.	PAYMENTS.				1923. Swansea.						1922. Plymouth.		
					£	s.	d.	£	s.	d.	£	s.	d.
	General:—												
clix	Salaries				1,327	9	7				1,326	8	5
”	Printing, Postage, Stationery, &c.				542	4	2				621	8	9
”	Journal				402	6	4				506	0	1
								2,372	0	1	2,453	17	3
	Show:—												
clxi	Implements				1,282	5	3				1,387	5	10
		£	s.	d.									
”	Horses	1,843	0	0							2,024	18	7
”	Cattle, Sheep, Goats and Pigs	3,823	5	4							3,767	0	7
”	Fodder, &c.	1,244	14	3							930	8	1
					6,910	19	7				6,722	7	3
9	Poultry				392	17	11				330	6	0
”	Shoeing				247	19	2				193	1	5
”	Timbering and Splicing				30	7	1						
”	Nature Study and Handicrafts				232	11	7				192	2	6
”	Forestry				191	6	1				210	1	2
”	Small Holdings and Allotments										136	17	0
”	Horticulture				333	4	1				314	5	1
clxv	Cheese and Butter				265	4	0				237	2	0
”	Working Dairy				737	18	9				775	14	4
”	Cider				163	1	1				132	11	3
”	Bees				10	0	0				7	10	0
”	Public Announcements				645	0	0				684	11	8
clxviii	Unapportionable:—												
	Erection of Offices, &c.	2,768	8	4							3,057	2	8
	Carriage of Plant	173	4	0							213	8	9
	Stand Fittings	279	16	3							356	8	8
	Police	519	15	0							474	6	0
	Miscellaneous	911	2	11							1138	18	10
					4,652	6	6				5,240	4	11
”	Swansea Show—Timber										622	3	10
								16,095	1	1	17,186	4	9
”	**Experiments**							100	0	0	109	0	11
								18,467	1	2	19,749	2	11
	Investments and Deposit							14,783	16	0	5,541	0	0
	Balance due to Bank, Jan 1st										3,610	2	6
	Balance in Bank, Dec. 31st							350	0	6	732	18	5
							£	33,600	17	8	29,633	3	10

January 14*th*, 1924.
Audited and found correct,
F. CLIFFORD GOODMAN, F.C.A.,
Auditor.

Passed by Council,
January 29*th*, 1924,
F. H. STORR,
Secretary.

The Bath and West and

CR. CASH ACCOUNT FOR THE YEAR ENDING DEC. 31ST,

RECEIPTS.				1923. Swansea.						1922. Plymouth.		
				£	s.	d.	£	s.	d.	£	s.	d.
DIVIDENDS AND INTEREST :—												
War Loan Stock	£205	2	6							207	17	5
Ditto (to replace Capital lost by Conversion)	12	4	9							6	11	5
South Australian Stock	31	12	1							30	1	0
New Zealand Stock	54	17	6							54	17	6
India Stock	226	3	0							226	3	0
Queensland Stock	65	19	4							65	10	4
New South Wales Stock	162	6	2							70	1	10
Canadian Pacific Railway Stock	45	15	0							48	13	7
Conversion 3½% Insc. Stock	81	7	6									
Interest on Deposit	45	15	0							9	13	0
				931	2	10				717	18	1
Income Tax returned										95	9	5
							931	2	10	813	7	6
GENERAL :—												
Telephone Way-leave							0	1	0	0	1	0
SUBSCRIPTIONS FROM MEMBERS :—												
Arrears				31	3	0				28	9	0
Governors				162	18	0				145	18	0
Subscribers of £1 and upwards				942	14	0				901	19	0
" 10s. "				6	0	0				7	10	0
							1,142	15	0	1073	16	0
LIFE COMPOSITIONS :—							45	0	0	20	0	0
JOURNAL :—												
Sales				6	14	1				4	1	1
Advertisements				59	2	11				58	5	10
							65	17	0	62	6	11
Carried forward						£	2,184	15	10			

Southern Counties Society.

1923, WITH COMPARATIVE STATEMENT FOR 1922 Dr.

PAYMENTS.	1923. Swansea.						1922. Plymouth.		
	£	s.	d.	£	s.	d.	£	s.	d.
SALARIES:—									
Secretary & Editor	650	0	0				650	0	0
Assistant Secretary	450	0	0				450	0	0
Office Staff	167	9	7				166	8	5
Auditor	30	0	0				30	0	0
Consulting Chemist	30	0	0				30	0	0
				1,327	9	7	1,326	8	5
MISCELLANEOUS:—									
Printing	77	13	9				39	12	8
Stationery and Finance Books	46	14	8				40	18	4
Postages, Telegrams Cheque & Receipt Stamps	116	17	6				112	18	0
Ground Rent and Rates	30	6	4				30	11	1
Property Tax	9	7	6				11	5	0
Travelling Expenses	48	2	5				68	11	9
Carriage of Goods	12	13	0				15	0	4
Directories and Reference Books	4	11	6				0	8	6
Subscriptions	9	2	0				8	1	0
Repairs and Fittings	40	5	5				18	19	5
Hire of Council Rooms	2	2	0				2	4	0
Fuel and Light	9	5	4				13	13	1
Finance and other Committee's Expenses	12	18	8				25	17	6
Telephone	12	4	1				15	14	3
Bank Charges	10	0	0				57	13	10
Council Grants and Allowance to Widow of late Secretary	100	0	0				160	0	0
				542	4	2	621	8	9
JOURNAL:—									
Printing and Stationery	306	15	7				393	17	6
Plans and Blocks	10	6	8				11	10	6
Distribution	36	1	1				44	9	1
Postages, Stationery, Reference Books, etc.	7	10	0				8	0	0
Authors	41	13	0				48	3	0
				402	6	4	506	0	1
Carried forward			£	2,272	0	1			

Cr. CASH ACCOUNT—*continued.*

RECEIPTS.		1923 Swansea.		1922. Plymouth.
		£ s. d.	£ s. d.	£ s. d.
Brought forward .			2,184 15 10	
IMPLEMENTS :—				
Fees for Space :—				
Machinery-in-Motion Shedding		849 10 0		964 10 0
Ordinary ,, . .		314 0 0		293 0 0
Miscellaneous ,, . .		258 15 0		428 10 0
Boarded ,, ...		787 10 0		832 10 0
Seed ,, . .		66 5 0		42 10 0
Uncovered Ground		540 14 2		427 8 9
Catalogue Fees		72 18 10		74 19 0
Entry Fees		70 10 0		79 0 0
Additional Assistants' Tickets . .		21 13 6		38 10 2
			2,981 16 6	3,180 17 11
HORSES, CATTLE, SHEEP, GOATS & PIGS :—				
Horses :—Entry Fees . .	£243 15 0			361 15 0
Fines . . .	1 10 0			1 0 0
Grand Stand Admissions	936 16 0			742 4 0
Special Prizes . .	87 15 0			214 5 0
		1,269 16 0		1,319 4 0
CATTLE, SHEEP, GOATS AND PIGS :—				
Entry Fees . .	£1,084 10 0			1,228 0 6
Fines	17 10 0			25 10 0
Special Prizes . . .	928 16 8			850 17 6
		2,030 16 8		2,104 8 0
Catalogues, Manure and Fodder	102 11 5			123 17 11
Advertisement in Prize List (2 years) . .	25 4 0			
		127 15 5		123 17 11
			3,428 8 1	3,547 9 11
Carried forward .		£	8,595 0 5	

CASH ACCOUNT—*continued*. DR.

PAYMENTS.		1923. Swansea.		1922. Plymouth.
		£ s. d.	£ s. d.	£ s. d.
Brought forward .			2,272 0 1	
IMPLEMENTS :—				
Shedding		1,086 17 6		1,167 14 3
Stewards and Assistants		103 18 9		119 18 10
Printing, Stationery, etc.		68 19 0		51 16 9
Fees returned		22 10 0		47 16 0
			1,282 5 3	1,387 5 10
HORSES, CATTLE, SHEEP, GOATS & PIGS :-				
Horses :—Prizes	£1,010 9 0			1,041 17 0
Shedding & Grand Stand	666 10 2			805 7 11
Stewards and Assistants	122 9 2			122 19 2
Judges . . .	43 11 8			54 14 6
		1,843 0 0		2,024 18 7
Cattle Prizes . .	1,252 11 2			1,122 0 0
Sheep Prizes . . .	677 0 0			728 0 0
Goats Prizes . . .	19 0 0			27 10 0
Pigs Prizes . . .	394 0 0			345 0 0
Dairy Herds . . .				58 0 0
Shedding and Canvas	1,192 6 7			1,182 10 6
Stewards and Assistants	89 13 3			89 14 1
Judges . . .	195 4 4			180 14 8
Fees returned .	3 10 0			7 5 0
Analyses of Milk .				26 6 4
		3,823 5 4		3,767 0 7
Buildings, etc. . . .	543 4 11			294 7 9
Fodder and Insurance . .	445 4 9			373 3 5
Forage Steward and Assistants	17 16 6			22 2 6
Veterinary Inspectors . .	30 7 9			33 17 10
Rosettes	20 0 0			24 16 3
Printing, Stationery & Prize Cheques	169 18 7			162 15 1
Refreshments to Judges .	18 1 9			19 5 3
		1,244 14 3		930 8 1
			6,910 19 7	6,722 7 3
Carried forward .			£10 465 4 11	

Cr. CASH ACCOUNT—*continued.*

RECEIPTS.	1923. Swansea.		1922. Plymouth.
	£ s. d.	£ s. d.	£ s. d.
Brought forward .		8,595 0 5	
POULTRY:—			
Entry Fees	95 11 0		81 4 6
Commission on Sales	0 16 0		0 14 0
		96 7 0	81 18 6
SHOEING:—			
Entry Fees	27 18 0		19 10 0
Special Prizes	6 0 0		20 0 0
		33 18 0	39 10 0
TIMBERING AND SPLICING:—			
Entry Fees	2 16 0		
Special Prizes	14 0 0		
		16 16 0	
SMALL HOLDINGS AND ALLOTMENTS .			54 3 0
Carried forward	£	8,742 1 5	

CASH ACCOUNT—*continued*. DR.

PAYMENTS.	1923. SWANSEA						1922. PLYMOUTH.		
	£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				10,465	4	11			
POULTRY :—									
Sheds, Staging, Pens and Runs	176	10	6				124	13	8
Steward and Assistants	40	10	2				44	15	10
Judges	14	10	6				11	10	9
Prizes	136	10	0				132	5	0
Printing, Stationery, Carriage, etc.	24	16	9				17	1	3
				392	17	11	330	6	6
SHOEING :—									
Prizes	44	10	0				54	10	0
Judges	13	17	7				12	9	4
Anvils, Forges, Coals, Horses, Printing, etc.	43	19	1				12	6	0
Shedding	112	15	2				78	12	2
Stewards and Assistants	17	17	4				20	3	11
Exhibition of Models	15	0	0				15	0	0
TIMBERING AND SPLICING :—				247	19	2	193	1	5
Prizes	14	0	0						
Judge	3	15	2						
Printing, Postages, etc.	2	16	6						
Labour and Fittings	9	15	5						
				30	7	1			
NATURE STUDY AND HANDICRAFTS :—									
Labour and Fittings	192	17	0				152	10	7
Steward and Assistants	33	12	4				35	1	8
Printing, Postage, Carriage, etc.	6	2	3				4	10	3
				232	11	7	192	2	6
FORESTRY :—									
Labour and Fittings	123	16	0				124	4	0
Steward, Judge and Assistants	11	16	0				16	19	4
Printing, Postage, etc.	6	11	0				3	4	6
Prizes, Grants and Demonstrator	49	3	1				65	13	4
				191	6	1	210	1	2
SMALL HOLDINGS AND ALLOTMENTS							136	17	0
HORTICULTURE :—									
Gratuities to Exhibitors	150	0	0				150	0	0
Pavilion and Staging	169	8	9				140	3	3
Steward and Assistants, Printing, etc.	13	15	4				24	1	10
				333	4	1	314	5	1
Carried forward			£	11,893	10	10			

Cr.

CASH ACCOUNT—*continued.*

RECEIPTS.		1923. SWANSEA.		1922. PLYMOUTH.
		£ s. d.	£ s. d.	£ s. d.
Brought forward . .			8,742 1 5	
CHEESE AND BUTTER :—				
Entry Fees and Fines.		57 10 6		51 17 6
Sales		12 15 0		16 3 8
Special Prizes		10 0 0		24 0 0
			80 5 6	92 1 2
WORKING DAIRY :—				
Entry Fees, Competitions .	£33 5 6			31 0 6
,, Tests .	21 0 0			29 0 0
		54 5 6		60 0 6
Sale of Produce		85 17 2		106 17 1
Special Prizes, etc.		16 0 0		13 12 0
			156 2 8	180 9 7
CIDER :—				
Entry Fees and Fines.			12 10 6	6 3 6
ADMISSIONS :—				
Admissions at 5s.		900 10 0		905 10 0
,, ,, 4s.		2,262 0 0		3,588 16 0
,, ,, 3s.		2,754 6 0		
,, ,, 2s. 6d.		22 15 0		18 7 6
,, ,, 2s.		6,658 6 0		3,184 2 0
,, ,, 1s. 6d.		164 12 6		
,, ,, 1s.		626 8 0		212 12 0
Season Tickets, etc.		363 8 9		226 17 6
			13752 6 3	8,136 5 0
Carried forward .		£	22,743 15 4	

CASH ACCOUNT—*continued.* DR.

PAYMENTS.	1923. Swansea						1922. Plymouth		
	£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				11,893	10	10			
CHEESE AND BUTTER:—									
Judges	9	9	10				8	3	4
Prizes	111	0	0				105	0	0
Stewards and Assistants	18	7	10				20	4	10
Shedding and Staging	119	6	1				97	18	4
Printing, Stationery, Carriage, etc.	7	0	3				5	15	6
				265	4	0	237	2	0
WORKING DAIRY:—									
Stewards and Assistants	72	11	6				82	8	5
Judges and Demonstrators	49	5	4				73	14	8
Buildings	387	16	9				332	18	3
Printing, Stationery, Postages, etc.	10	10	1				8	1	9
Utensils, Carriage, etc.	88	17	7				128	18	6
Prizes	59	13	9				64	10	6
Coal, Salt, Ice, etc.	11	11	3				10	11	0
Purchase of Milk and Cream	43	17	6				55	10	0
Purchase of Plant	13	15	0				–	–	–
Analyses							19	1	3
				737	18	9	775	14	4
CIDER:—									
Shedding and Fittings	41	13	7				52	13	4
Steward and Assistants	27	17	0				27	14	5
Judge	7	12	6				5	13	0
Prizes	50	0	0				30	0	0
Analyses, Carriage, Printing, etc.	35	18	0				16	10	6
				163	1	1	132	11	3
BEES:—									
Grant to Beekeepers' Association				10	0	0	7	10	0
PUBLIC ANNOUNCEMENTS:—									
Advertising	277	4	5				305	4	2
Billposting	219	18	11				240	16	8
Railway Placards	85	15	0				72	0	0
Printing	62	1	8				66	10	10
				645	0	0	684	11	8
Carried forward			£	13,714	14	8			

CR.

CASH ACCOUNT—*continued.*

RECEIPTS.	1923. SWANSEA.						1922. PLYMOUTH.		
	£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				22,743	15	4			
SHOW (UNAPPORTIONABLE)—									
Sales, Fittings, etc.	664	7	9				717	12	8
Contract Premiums	549	5	8				455	11	0
Cloak Rooms, Lavatories, etc.	130	16	8				114	4	2
Local Committee for Police	157	10	0						
				1,502	0	1	1,287	7	10
SUBSCRIPTION FROM SWANSEA for 1923 Show							800	0	0
				24,245	15	5	19,380	17	10
Timber in hand from Plymouth Show				622	3	10	6,752	6	0
Deposit returned				8,000	0	0	3,500	0	0
Balance in Bank, January 1st				732	18	5			
			£	33,600	17	8	29,633	3	10

CASH ACCOUNT—*continued*.

DR.

PAYMENTS.	1923 Swansea.						1922. Plymouth.		
	£	s.	d.	£	s.	d.	£	s.	d.
Brought forward				13,714	14	8			
SHOW (Unapportionable):—									
Official Buildings, etc.	2,207	1	0				2,661	19	3
Hoarding	561	7	4				395	3	5
Carriage of Plant	173	4	0				213	8	9
Stand Fittings	279	16	3				356	8	8
Insurance	75	0	2				86	9	6
Furnishing Official Buildings, etc.	108	14	3				80	0	0
Mess Room, Allotment Expenses, etc.	39	10	10				20	7	6
Gatekeepers, Yardmen, Messengers, etc.	198	9	4				210	9	5
Stewards of Finance and Treasurer	45	1	7				36	1	10
Inspector of Cash and Assistant	55	10	7				56	6	4
Secretaries' expenses Finance and Treasurer's Clerks	47	6	9				46	7	6
Police	519	15	0				474	6	0
Badges, etc.	4	10	0				3	18	4
Catalogues for Press and Officials	21	18	6				6	13	6
Purchase of Plant	44	15	3				68	15	8
Printing, Stationery, etc.	105	14	5				99	19	8
Telegraph and Telephone	44	7	2				81	1	7
Commission on Season Tickets	11	13	6				4	18	2
Council Grants	105	0	0				300	0	0
Show Yard Lecturers	3	10	7				18	3	6
Rent of Motor Garage Field							21	6	4
				4,652	6	6			
							5,240	4	11
1923 SHOW TIMBER							622	3	10
EXPERIMENTS:—									
Cider—Grant to Cider Institute				100	0	0	100	0	0
ROUGH PASTURES							9	0	11
				18,467	1	2	10,740	2	11
Investments and Deposit				14,783	16	0	5,541	0	0
Balance due to Bank, January 1st.							3,610	2	6
Balance in Bank, Dec. 31st				350	0	6	732	18	5
			£	33,600	17	8	29,633	3	10

JANUARY 14TH, 1924.

I hereby certify that I have examined the foregoing accounts for the year ending December 31st, 1923, compared the payments entered with the vouchers, and found them all in order and correct.

F. CLIFFORD GOODMAN, F.C.A.,
Auditor.

Passed by Council,
January 29th, 1924.
F. H. STORR, Secretary.

ASSETS AND LIABILITIES ACCOUNT TO DECEMBER 31st, 1923, WITH COMPARISON FOR 1922.

ASSETS.

ASSETS.				1923. Swansea.	1922. Plymouth.
				£ s. d.	£ s. d.
INVESTMENTS				21,783 4 9	16,963 4 11
£ s. d.	STOCK.	Actual Cost £ s d.	Market Value on Dec. 31. £ s d.		
1,568 1 6	New Zealand 3½% 1940	1,500 0 0	1,285 16 4		
4,099 11 1	War Loan 5% 1929/47	5,809 19 6	4,099 11 1		
265 8 9	Do. to replace cap. lost b conversion of Consols	252 8 3	265 8 9		
7,538 15 1	India 3%	7,277 5 1	4,259 7 11		
1,649 3 11	Queensland 4% 1924	2,000 0 0	1,616 8 4		
4,057 16 0	N. S. Wales 4% 1933	4,000 0 0	3 611 8 9		
1,500 0 0	Can. Pacific R. 4% Deb.	1,576 2 6	1,215 0 0		
1,036 3 3	South Aus. 4% 1940/60	1,000 0 0	870 7 7		
6,000 0 0	Conversion 3½% Inscribed	4,747 16 0	4,560 0 0		
		28,163 11 4	21,783 4 9		
CASH ON DEPOSIT				2,000 0 0	
FUND FOR REPLACEMENT OF CAPITAL				42 0 3	36 11 4
INCOME TAX RECOVERABLE					16 18 8
SHOW PLANT				1,442 15 3	1,544 11 1
SHOW TIMBER					622 3 10
HOUSE PROPERTY			£633 10 7		633 10 7
FURNITURE AND FITTINGS			172 19 1		177 7 9
				806 9 8	810 18 4
DUE FROM TAUNTON FOR 1924 SHOW				800 0 0	
SUBSCRIPTION ARREARS				179 13 0	160 12 0
JOURNAL SALES				2 10 0	2 10 0
A/cs DUE					37 12 0
				27,056 12 11	20,195 2 2
BALANCE IN BANK Dec. 31st				350 0 6	732 18 5
				£ 27,406 13 5	20,928 0 7

LIABILITIES.

LIABILITIES.	1923. Swansea.	1922. Plymouth.
	£ s. d.	£ s. d.
TAUNTON MEETING	800 0 0	800 0 0
JOURNAL cost of, estimated at	550 0 0	550 0 0
DUE TO FUND FOR REPLACEMENT OF CAPITAL	42 0 3	36 11 4
A/cs UNPAID		4 12 8
INCOME TAX DEMAND	146 18 6	
	1,538 18 9	1,391 4 0
BALANCE	25,867 14 8	19,536 16 7
	£ 27,406 13 5	20,928 0 7

January 14th, 1924.

I hereby certify that I have audited the above Balance Sheet, and that, in my opinion, it is correct, and shows the true position of the Society's affairs according to the Books. The securities for the Society's Investments have been produced to me, and I have found them in order. The various Stocks have been valued by the Society's Bankers.

F. CLIFFORD GOODMAN F.C.A., Auditor

Passed by Council
January 29th, 1924,
F. H. STORR, Secretary.

Bath and West and Southern Counties Society.

STATEMENT SHOWING FINANCIAL RESULT OF THE SWANSEA (1923) SHOW.

Printed Financial Statements.										
Page		£	s.	d.	£	s.	d.	£	s.	d.
clvi	Show Receipts as per Summary	22,060	19	7						
,,	Subscription from Local Committee received in 1922 . ..	800	0	0						
					22,860	19	7			
clxviii	Less 1922 A/cs. received in 1923..				37	12	0			
								22,823	7	7
clvii	Show Payments as per Summary	16,095	1	1						
,,	Value of Timber in hand from 1922	622	3	10						
		16717	4	11						
clxviii	Less 1922 A/cs. paid in 1923 ..	4	12	8						
					16,712	12	3			
clxvii	Less Show Plant purchased ..	44	15	3						
clxv	,, Dairy ,, ,, ...	13	15	0						
		58	10	3						
	Less 10 per cent. for depreciation ..	5	17	0						
					52	13	3			
								16,659	19	0
	Profit on Show				£			6,163	8	7

Bath and West and Southern Counties Society,

FOR THE

Encouragement of Agriculture, Arts, Manufactures and Commerce.

List of Members, 1924.

PATRON.

HIS MOST GRACIOUS MAJESTY THE KING.

PRESIDENT.

LIEUT.-COL. SIR DENNIS F. BOLES, BART., C.B.E., D.L.

TRUSTEES.

THE MOST HON. THE MARQUIS OF BATH, K.G.
C. L. F. EDWARDS, ESQ.
SIR J. SHELLEY, BART.

Names thus (*) distinguished are Governors.
Names thus (†) distinguished are Life Members.
*** *Members are particularly requested to make the Secretary acquainted with any errors in the names or residences.*

Name	Residence	Sub-scriptions £	s.	d.
*†His Most Gracious Majesty the King	Windsor Castle	..		
*†Wales, H.R.H. Prince of K.G.	St. James' Palace, London ..	..		
Ackers, Chas. P.	Huntley Manor, Gloucester ..	1	0	0
Ackland, J.	Francis Court, Broadclyst, Exeter	1	0	0
Acland, Alfred Dyke ..	.. ..	1	0	0
†Acland, Right Hon. Sir Arthur H. Dyke	85, Onslow Square, London, S.W.7	..		
Acland, Right Hon. F. Dyke, M.P.	93, Bedford Gardens, Campden Hill, London, W.	1	0	0
Adams, E. C...	The Cedars, Trowbridge, Wilts	1	0	0
Adlam, J. C.	Manor Farm, East Horrington, Wells	1	0	0
Aitken, Brig.-Gen.	3, Catherine Place, Bath ..	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Aldridge, D.	Sketchley Hall Farm, nr. Hinchley, Leicester	1	0	0
Alexander, Hubert	5, High Street, Cardiff	1	1	0
Allen, A.	Chesterblade, Shepton Mallet	1	0	0
Allen & Foster	Corn and Seed Merchants, Shepton Mallet	1	1	0
Allen & Sons	Cheese Merchants, Shepton Mallet	1	1	0
†Allen, Miss Ida Helena	Springfield House, Shepton Mallet		..	
Allen, W. T.	Bradley House, West Pennard, Bridgwater	1	0	0
Allott, Major P. B.	Little Ashton, Codford, Wilts	1	0	0
Allsebrook, A.	Frenches Farm, Mark Cross, Sussex	1	1	0
Amesbury, A.	Loxton, Axbridge	1	1	0
Anderson, Sir J.	Harrold Priory, Sharnbrooke, Beds	1	0	0
Angerstein, J. R.	Holbrook House, Wincanton	1	0	0
Angier, Capt. R.	Mousefield, Newbury, Berks.	1	1	0
Anglo-Continental Guano Works	Dock House, Billiter Street, E.C. 3	1	0	0
Anglo-Swiss Condensed Milk Company	Chippenham	1	0	0
*Ansdell C. W.	Leckford Abbas, Stockbridge, Hants	2	0	0
Anthony, A.	Bryn Garth Piggeries, Bryn Garth, Hereford	1	0	0
†Aplin, R. M. S.	Digby Hotel, Sherborne		..	
Armitage, T. C.	Dean Court, Taunton	1	1	0
Armitage, Mrs.	Dean Court, Taunton	1	1	0
Armstrong, E. G.	Land Farm, Kew Stoke, Somerset	1	0	0
Arnold and Sons	52, Wigmore Street, London, W.	1	0	0
†Ashcomb, Lord	Denbies, Dorking		..	
†Ashcroft, W.	13, The Waldrons, Croydon		..	
Asher, S. G.	Ascot Place, Ascot	1	0	0
Associated Manufacturers Co.	72-80, Mansell Street, Aldgate, E.1	1	0	0
*Astor, Lord	Cliveden, Taplow, Bucks	2	0	0
Atkinson, Brig.-Gen. B., C.B., C.M.G.	Mistley Hall, Manningtree, Essex	1	0	0
Austin, E. A.	Baltonsborough, Glastonbury	1	1	0
†Avebury, Lord	High Elms, Hayes, Kent		..	
†Aveling, Thomas L.	Rochester		..	
Avery, N.	Markham Farm, Easton in Gordano, Bristol	1	0	0
Avon Manure Company (Ld.)	St. Philip's Marsh, Bristol	1	0	0
Badcock, H. Jefferies	Broadlands, Taunton	1	0	0
Badock, S. H.	Holmwood, Westbury-on-Trym, Bristol	1	1	0

Name	Residence	Subscriptions £	s.	d.
Bagnall, O. R.	The Howsells, Malvern Link ..	1	0	0
Bainbridge, Mrs. R. C. ..	Elfordleigh, Plympton, Devon ..	1	0	0
†Baker, Hiatt C.	Oaklands, Almondsbury		..	
Baker, G. E., J.P.	The Old House, Freshford, Bath ..	1	1	0
Baker, G. E. Lloyd	Hardwicke Court, Gloucester ..	1	0	0
†Baker, M. G. Lloyd ..	The Cottage, Hardwicke, Glos...		..	
Ball, A. E.	Coulston House, Westbury, Wilts	1	0	0
Bamfords (Ld.)	Uttoxeter	1	0	0
Barber, J. Guttridge ..	Fylde House, Oxford Road, Exeter	1	0	0
Barford & Perkins (Ld.) ..	Peterborough	1	0	0
Barham, G. T.	Sudbury Park, Wembley, Middlesex	1	1	0
Baring, Hon. A H.	The Grange, Alresford, Hants ..	1	0	0
*Barker-Hahlo, H.	.. ..	2	0	0
Barnes, Major-Gen. Sir R. W. R., K.C.B., D.S.O. ..	Oakhay, Stoke Canon, near Exeter	1	0	0
Barry, Lieut,-Col. A. P. ..	Baltonsborough, Glastonbury ..	1	0	0
Barstow, J. J. J.	The Lodge, Weston-super-Mare..	1	1	0
Barton, D. J...	Bodrean, Truro, Cornwall ..	0	10	0
Barton, W. L.	Easton House, Corsham ..	1	0	0
Basic Slag and Phosphate Co. (Ld.)..	69, Queen Victoria Street, London, E.C.4	1	0	0
Bassett, A. F.	.. ..	1	0	0
Bastard, H. E.	Tinten Manor, St. Tudye, S.O., Cornwall	1	0	0
*†Bath, Marquis of, K.G. ..	Longleat, Warminster		..	
Bath Gas Company	Bath	1	0	0
Bathurst, Hon. B. L. ..	Lydney Park, Gloucester ..	1	1	0
Bathurst, Lady Hervey ..	Somborne Park, Stockbridge ..	1	1	0
Bathurst, Major Sir F. Hervey, Bart., D.S.O. ..	Somborne Park, Stockbridge, Hants	1	1	0
Batt, R.	Clapton, Ston Easton, Bath ..	1	1	0
Batt, T. T.	West Hill, Heytesbury	1	0	0
*†Batten, Major H. C., D.S.O.	Aldon, Yeovil		..	
Batten, Col. Cary	Abbotsleigh, Bristol	1	0	0
Batten-Pooll, R. H.	Road Manor, Bath	1	0	0
†Baxendale, J. Noel	Froxfield Green, Petersfield ..		..	
Beak, J. D.	Maiden Bradley, Bath	1	1	0
Beatty, A. Chester	Calehill Park, Little Chart, Kent	1	0	0
Beauchamp, L. B.	Norton Hall, near Bath ..	1	0	0
Beauchamp, Sir F. B. ..	Woodborough House, Peasedown St. John, Bath	1	1	0
*Beaufort, Duke of	Badminton, Chippenham ..	2	2	0
Bell, Lieut.-Colonel M. G. E.	Bourne Park, near Canterbury ..	1	0	0
Bell, Sir James	Bellfield, Willerby, Hull	1	0	0
Benett-Stanford, Capt. J. ..	Hatch House, Tisbury	1	0	0
Bennett, Brothers	*Journal* Office, Salisbury	1	1	0

Name	Residence	Sub-scriptions		
		£	s.	d.
Bennett, R. A.	Thornbury, Glos.	1	0	0
Bentall, Edward H. & Co.	Heybridge, Maldon, Essex	1	0	0
Beny n H. A.	Englefield House, Reading	1	1	0
*Benvon, . Herbert	Englefield House, Reading	5	0	0
Berry, A. E.	Rowgardens Wood, Charlwood, Surrey	1	0	0
Berry, Grosvenor	Mount Bures, Bures, Suffolk	1	0	0
Berry, H. W.	Blackmoor Farm, Langford, near Bristol	1	0	0
Berryman, F. H.	Field House, Shepton Mallet	1	1	0
Bessant, W.	Skinners Farm, Woolland, Blandford, Dorset	1	0	0
Best, Major T. G.	East Carleton Manor, Norwich	1	0	0
†Best, Capt. W.	Vivod, Llangollen, N. Wales		..	
Best, Hon. J. W.	Charlton House, Ludwell, Salisbury	1	0	0
Beynon, Sir J. W., Bart., C.B.E.	Merthyr House, Cardiff	1	1	0
Biddle, W. F.	Parsonage Farm, Butleigh, Glastonbury	1	0	0
Bide, S. and Sons	Pedigree Pig Farm, Farnham, Surrey	1	0	0
Bird, Kelly	Walton Farm, Walton, near Bridgwater	1	0	0
Birkett, E.	Biddlestone Farm, Brooke Ashford, Kent	1	0	0
Birmingham, C.	Nutscale, The Parks, Minehead	0	10	0
Bishop, B. G.	Roddimore, Winslow, Bucks	1	1	0
Bishop, G., M.R.C.V.S.	Scotland House, Brislington, Bristol	1	0	0
Bishop, Major J. H.	Dynevor Estate Office, Ammanford, S. Wales	1	0	0
†Blackburn, H. P.	Donhead Hall, Salisbury		..	
Blacker, E. G.	Northend Farm, Clutton	1	0	0
†Blackstone, G. M.	Blackstone & Co., Ltd., Stamford		..	
Blake, Col. M. Lock	Bridge, S. Petherton	1	0	0
Bland, V. S.	Estate Office, Foxhill, Wanborough, Wilts	1	0	0
Blandy, Capt. S. H. B.	Ivythorn Manor, Street, Somerset	1	0	0
Blathwayt, R. W.	Dyrham Park, Chippenham	1	1	0
Blathwayt, Rev. W. E.	Dyrham Rectory, Chippenham	1	0	0
Blay, G.	New Malden, London, S.W.	1	0	0
†Bledisloe, Lord, K.B.E.	Lydney Park, Gloucester		..	
Bledisloe, Lady	Lydney Park, Gloucester	1	1	0
Blinman, F. R.	Auctioneer, Farrington Gurney, Bristol	1	0	0
Blinman, H. T.	Auctioneer, Farrington Gurney, Bristol	1	0	0

Name	Residence	Sub-scriptions		
		£	s.	d.
*Blythswood, Lord	Penrice Castle, Reynoldston, S.O., Glamorgan	2	0	0
Blythswood, Lady	Penrice Castle, Reynoldston, S.O., Glamorgan	1	0	0
Board, W. R.	Great Frampton, Llantwit Major, Cardiff	1	0	0
Body, J. B.	Hindhead Court, Hindhead, Surrey	1	1	0
Boles, Lt.-Col. Sir Dennis F., Bart, C.B.E., D.L.	Watts House, Taunton	1	0	0
*Boles, G. F.	17th Lancers, Alival Barracks, Tidworth	2	0	0
Bolitho, R. F.	Ponsandane, Penzance	1	1	0
Bolitho, T. R.	Trengwainton, Hea Moor, Cornwall	1	1	0
Bonar, T. L.	Preston Hall, Aylesford, Kent	1	0	0
Bond, A. E.	Wannerton, Kidderminster	1	0	0
Bond E. (W. Evans & Co.)	Hele, Cullompton	1	0	0
Boscawen, Rev. A. T.	Ludgvan Rectory, Long Rock, R.S.O., Cornwall	1	0	0
Boscawen, Townshend E.	2, Old Burlington Street, London, W.1	1	0	0
Bouverie, H. P.	Brymore, Bridgwater	1	0	0
†Bowen-Jones, Sir J., Bart.	The Woodlands, Bicton, near Shrewsbury	..		
†Bowerman, Alfred	Sydney Villa, Broadclyst, Exeter	..		
Braby, F. & Co. (Ld.)	Ashton-Gate Works, Bristol	1	0	0
Bracey, W.	Manor House, Martham, Great Yarmouth	1	0	0
Bracher, G. R.	Heathermead, Stone, near Falfield, Glos.	1	1	0
Bradford, Thomas & Co.	Salford, Manchester	1	0	0
*Braithwaite, T. S.	Durley Hill, Keynsham, Somerset	2	0	0
Branch, H. S.	West End, Foxham, Chippenham	1	0	0
Brasnett, A. W., Veterinary Surgeon,	Wells	1	0	0
*†Brassey, H. L. C.	Apethorpe Hall, Wansford, Northants	..		
†Brassey, Capt. R. B.	Heythrop, Chipping Norton	..		
Brenton, W. (Ltd.),	St. Germans, Cornwall	1	0	0
Brewis, Major A.	Polhampton, Overton, Hants.	1	0	0
Bridges, J. H.	The Court, Eastbourne	1	1	0
Briggs, Mrs. H.	The Grange, North Stoke, Wallingford, Berks.	1	1	0
†Brinkley, Rev. W, F. B.	The Vicarage, Abbots Leigh, Bristol	..		
Bristol Times and Mirror, Proprietors of	Bristol	1	0	0
Bristol Wagon & Carriage Works Co., (Ltd.),	Bristol	1	1	0

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		£	s.	d.
British Oil and Cake Mills (Croad & Brown Branch)	Bridgwater	1	1	0
Britten, Forester	Kenswick Manor, Worcester	1	0	0
Britten, W. C.	Dungeon Farm, Croscombe	1	0	0
†Brocklehurst, H. D.	Sudeley Castle, Winchcombe		..	
Brockman, F. D.	..	1	0	0
Broughton, B. R.	Manor Farm, North Perrott, Crewkerne	1	0	0
Brown A. and J.	Haydon Hill, Aylesbury	1	0	0
Brown, F. E.	1,403, Neath Road, Swansea	1	0	0
Brown, T. and Son	Marham Hall, near Downham, Norfolk	1	0	0
Browning, T.	Nash End Farm, Eastington, Stonehouse, Glos.	0	10	0
Browning, W.	Nash End Farm, Eastington, Stonehouse, Glos.	0	10	0
†Bruford, E. J.	Nerrols, Taunton		..	
Bruford, R.	Nerrols, Taunton	1	0	0
Brymer, W. J.	West Down Lodge, Winchester	1	0	0
Buchanan, W. G.	Manor House Farm, Abergavenny	1	0	0
Buck, D.	White House, Little Mill, Pontypool	1	0	0
Buckingham, Rev. C. L.	Rotherfield, Sussex	1	1	0
†Buckingham, Rev. Preb.	The Rectory, Doddiscombsleigh, Exeter, Devon		..	
Buckingham, Capt. F. R.	Dishcombe, South Tawton, near Okehampton	1	0	0
Buckley, S. W.	Danygraig, Pembrey	1	0	0
Budd, Felix S.	Clarendon House, Stow Park, Newport, Mon.	1	0	0
Budd, J. E.	Tidebrook Manor, Wadhurst, Sussex	1	0	0
Bullows, Miss M. A.	Metchley, Barlows Road, Edgbaston, Birmingham	1	1	0
Burdge, J.	Claverham, near Bristol	1	0	0
Burdge, J. H.	Yatton, near Bristol	1	1	0
Burnard & Algar	Plymouth	1	0	0
Burrell, C. and Sons	St. Nicholas Works, Thetford	1	1	0
†Bush, H. G.	The Grove, Alveston, Glos.		..	
Bush, Mrs. L. E.	St. Mary's, Atlantic Road, South, Weston-super-Mare	1	1	0
Busk, Mrs.	Wraxall, Manor. Cattistock, Dorset	1	0	0
*Bute, The Marquis of	The Castle, Cardiff	2	0	0
Butler, W.	Gatcombe Farm, Flax Bourton, Bristol	1	0	0
Cable, Lord	Lindridge, near Teignmouth	1	1	0
Cadozo, C. H.	Sedgewell House, Chudleigh, Devon	1	0	0

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		£	s.	d.
Cæsar, H. and J.	Knutsford, Cheshire	1	0	0
Campbell, J.	31, St. Albans Road, Swansea	1	0	0
Campbell, Major D., D.S.O.	Lady's Wood, Malmesbury, Wilts.	1	0	0
Candy, T. C.	Woolcombe, Cattistock, Dorset	1	0	0
Candy, H. J.	Upper Lodge Farm, Ston Easton, Bath	1	0	0
Carew, C., M.P.	Collipriest, Tiverton	1	0	0
†Carruthers, W., F.R.S.	14, Vermont Road, Norwood, London, S.E.	..		
†Carter, E.	East Upton, Ryde, Isle of Wight	..		
Carter, G. V.	Waterston Manor, Dorchester	1	1	0
Carter, J. R.	8, Julian Road, Folkestone	1	0	0
Carter, J. & Co.	Raynes Park, London, S.W.	1	0	0
Cartridge, W. T. B.	Sidbury, Worcester	1	0	0
Cartwright, T. G.	30, Beaufort Gardens, London, S.W	1	0	0
Cary, Edmund	Pylle, Shepton Mallet	0	10	0
†Cary, John	The Priory, Shepton Mallet	..		
†Cary, W. H.	Junior Constitutional Club, Piccadilly, London, W.1.	..		
Cattybrook Brick Co. (Ltd.)	Provident Buildings, 15, Clare Street, Bristol	1	0	0
Cave, Captain A. L.	Sherwood, Newton St. Cyres, Exeter	1	0	0
Cave, Sir C. H., Bart.	Sidbury Manor, Sidmouth	1	0	0
Cave, E. C.	Paccombe, Sidford, Sidmouth, Devon	1	0	0
Chapman, W. W.	Mowbray House, Norfolk Street, Strand, London, W.C.2.	1	1	0
Chatterton & Ord	Hunting Stables, Marston Magna	1	0	0
Chester, J. & Co.	York House, Newmarket	1	0	0
Chichester, Major C. H.	Hall, Bishops Tawton, Barnstaple	1	0	0
Chichester, H.	Verbere, Willand, Cullompton	1	0	0
†Chick, J. H.	Wynford Eagle, Maiden Newton, Dorset	..		
†Chick, W. D.	Compton Valence, Dorchester	..		
*Chinneck, W. J.	Trobridge House, Crediton	2	0	0
Chivers and Son	Histon, Cambridge	1	0	0
Christie, A. L.	Tapeley Park, Instow, N. Devon	1	1	0
Christie-Miller, S. R.	Clarendon Park, Salisbury	1	0	0
Churchill, The Viscount, G.C.V.O.	Carlton Club, Pall Mall, London, S.W.1.	1	0	0
†Churchward, F.	Hill House, Stoke Gabriel, near Totnes	..		
Clare, A. J.	Beach House, Wells	1	0	0
*Clarendon, Earl of	The Grove, Watford	2	2	0
Clark, H.	North Wootton, Shepton Mallet	1	0	0
Clark, H. B.	Butleigh, Glastonbury	1	0	0

Name	Residence	Sub-scriptions		
*†Clark, J, J.	Goldstone Farm, Hove, Sussex (Hon. Local Sec., 1885)	..		
Clark, W. S.	Street, Glastonbury	1	0	0
†Clarke, C. S.	Tracy Park, near Bath	..		
Clarke, J. W.	Bridwell, Cullompton	1	0	0
Clatworthy, E.	Cutsey, Trull, Taunton	1	1	0
*Clifden, Viscount	Lanhydroc, Bodmin	2	0	0
Clinton, Lord	Heanton Satchville, Dolton, N. Devon	1	0	0
Clive, Capt. E. A. B.	Brympton, near Yeovil, Somerset	1	0	0
Clutton, R. W.	Hartswood, Reigate	1	0	0
Cobb, H. M.	Higham, Rochester	1	0	0
Cobb, R.	Watlynge, near Rochester	1	0	0
Cole, J. J. B.	Combe Manor, Hungerford	1	0	0
Colebrook, H. J.	Fulmer Hall, Fulmer, Bucks.	1	0	0
Coleridge, Hon. G. D.	The Chanter's House, Ottery St. Mary, Devon	1	0	0
Collet, Sir Mark, Bart.	St. Clare, Kemsing, Sevenoaks	1	1	0
Collins, A. H.	Manor Farm, Codford St. Peter, Wilts.	1	0	0
Collins, J. S.	St. George's Lodge, Oldfield Park, Bath	1	1	0
Colman, Sir J., Bart.	Gatton Park, Surrey	1	0	0
Colmer, Jas. (Ltd.)	Union Street, Bath	1	0	0
Colston, Lieut.-Col. the Hon. E.	Hamilton House, Ashburn Place, S.W.7.	1	0	0
Colville, H. K.	Hillmarton Lodge, Calne, Wilts.	1	0	0
Cook, R.	Widhayes, Tiverton	1	0	0
Cookson, Mrs. Freville	Chute Standen, Andover	1	0	0
Cookson, Miss W.	Chute Standen, Andover	1	0	0
Cooling, G. and Sons	Northgate Street, Bath	1	1	0
Coonan, J. F.	Balmoral House, Mumbles, Swansea	1	0	0
Cooper, Sir G., Bart.	Hursley Park, Winchester	1	0	0
Cooper, Major R. W.	Rush Court, Wallingford	1	0	0
Cope, W.	Southerndown, Glam.	1	1	0
Corbet, E. W. M.	Bute Estate Office, Cardiff	1	1	0
Corbett, S. E.	Perseverance Iron Works, Shewsbury	1	0	0
†Cork and Orrery, The Earl	..	..		
†Corner, H. W.	Manor House, Inglescombe, Bath	..		
Cornish, Dr.	Pixford, Taunton	1	0	0
†Cornwallis, Col. F. S. W.	Linton Park, Maidstone	..		
Corp, R.	Woodford Farm, Wells	1	0	0
Cory, Sir Clifford J., Bart., M.P., D.L.	Llantarnam Abbey, Mon.	1	0	0
Coryton, Capt. J. T.	Pentillie Castle, St. Martin's, R.S.O.	1	0	0
†Cotterell, Sir J. R. G., Bart.	Garnons, Hereford	..		

Name	Residence	Sub-scriptions		
		£	s.	d.
Cotton, R. W.	Baltonsborough, Glastonbury	1	0	0
Coultas, J. R.	Allington, near Grantham	1	0	0
Coultrip, A. W.	Norwood Manor, East Church, Kent	1	0	0
†Courage, Raymond	Shenfield Place, Brentwood, Essex		..	
Cousins, Chas.	Jenkins, Stisted, Braintree, Essex	1	0	0
†Coussmaker, Lt.-Col. G.	Westwood, Normandy, Guildford, Surrey		..	
*Coventry, The Earl of	Croome Court, Worcester	2	0	0
Cowie, G. A.	39, Victoria Street, Westminster, London, S.W.1	1	0	0
Cox, S. V.	Pwlpen, Bishpool, Newport, Mon.	0	10	6
Cox & Sons	47, City Road, Cardiff	1	0	0
Crawford, H. W.	Lloyd's Bank Chambers, Swansea	1	0	0
Criddle, A. M. B.	Worle, Weston-super-Mare	1	0	0
Cridlan, J. J.	Maisemore Park, Gloucester	1	0	0
Croker, W. J.	Grapnel Farm, Dinder, Wells	1	0	0
Crompton's Pure Salt Brick Co. (Ltd.)	255, Chapel Street, Salford	1	0	0
Cross, F. R.	Worcester House, Clifton	1	1	0
*Cross, Carlton	Wyke Hall, Gillingham	2	0	0
Cross, G.	Smart's Hill House, Penshurst, Kent	1	0	0
Crossman A.,	Ivythorn, Street, Somerset	1	0	0
Crossman, B.	Chestnut Farm, Claverham, near Bristol	1	1	0
Crossman, D.	Lower Farm, West Horrington, Wells	1	0	0
Crossman, H. H.	Ham Farm, Yatton	1	0	0
Crutchley, P. E.	Limminghill Lodge, Ascot	1	0	0
Cumber, W. J.	Theale, Berks	1	0	0
Cuming, Edwin J.	Langhill, Moretonhampstead, Devon	1	0	0
Cundall, H. M., I.S.O., F.S.A.	4, Marchmont Gardens, Richmond Hill, Surrey	1	0	0
†Curre, E.	Itton Court, Chepstow		..	
Currie, L.	Minley Manor, Farnborough, Hants	1	0	0
Dairy Supply Company (Ltd.)	Museum St., Bloomsbury, London, W.C.9	1	0	0
Dalby, D. W. (P. C. Henderson, Ld.)	West Bank Works, Barking, London, E.	1	0	0
Dalyrmple, Major F. B.	Bartley Lodge, Cadnam, Hants.	1	0	0
Daniel, F. W. A.	Higher Ford, Wellington, Somt.	1	0	0
†Daniel, H. T.	The Red House, Cannington, Bridgwater		..	
Daniel, Thos. C.	Stuckeridge, Bampton, North Devon	1	1	0
Darby, A. E. W.	Little Ness, Shewsbury	1	0	0
Darby, E.	Liscombe, Dulverton	1	0	0

Name	Residence	Sub-scriptions		
		£	s.	d.
†Darell, D.	Hillfield House, Stoke Fleming, near Dartmouth		..	
Davey, Sleep & Co. (Ltd.)	Excelsior Plough Works, Plymouth	1	0	0
†Davey, T. R.	Wraxall Court, near Bristol		..	
David & David	Old Bank Chambers, 27, High Street, Cardiff	1	0	0
Davies, D.	12, The Promenade, Swansea	1	1	0
*Davies, D. G.	Fir Grove, Morriston, Swansea	2	2	0
Davies, T. W.	The Cefn, Pontypridd	1	0	0
Davies, F. W.	Wesfra, Bishopston, Glam.	1	0	0
Davies, M. J.	Killay Fach Farm, Killay, Glam.	1	0	0
Davies, W.	Highfield, Llanelly	1	0	0
Davis, E. K.	Little Stoke, Patchway, near Bristol	1	0	0
†Davis, H. J.	Sutton Montis, Sparkford, S.O., Somerset		..	
Davis, J.	Manor Farm, Hendon, Wells	1	0	0
Davis, & Co.	75, George Street, Oxford	1	0	0
Daw, J. E.	4, Louisa Terrace, Exmouth	1	1	0
Dawnay, Major-Gen. G. F.	Longparish House, Whitchurch, Hants	1	0	0
Day & Sons (Ltd.)	Crewe	1	0	0
*†Debenham, E. R.	Morton House, near Dorchester		..	
Debenham, H.	Buckland House, Buckland St. Mary, Taunton	1	0	0
Demuth, R. H.		1	0	0
Dening, & Co.	Chard, Somerset	1	0	0
Denning, R. J.	Little Ashwell Farm, Ilminster	1	0	0
Dennis, S.	Latton, Cricklade, Wilts.	1	0	0
†Devas, H. G.	"Nizels," Hildenborough, Tonbridge		..	
Devenish, H. N.	Little Dunford, Salisbury	1	0	0
*Devon, The Earl of	Powderham Castle, Devon	2	0	0
Dickinson, W. F.	Kingweston, Taunton	1	0	0
Dickson & Robinson	Cathedral Street, Manchester	1	1	0
*Digby, Capt., The Lord, D.S.O., M.C. (Coldstream Guards)	Minterne, Cerne Abbas	2	0	0
Digby, F. J. B. Wingfield	Sherborne	1	0	0
Dinam, Estates Co.	The Offices, Llandinam, Montgomery	1	0	0
†Dobson, H. V.	Bath & County Club, Bath		..	
Dodington, Lt.-Col. R. M.	Horsington Park, Templecombe	1	1	0
Dormer, Capt. C. W. C.	Rousham, Oxford	1	0	0
Dors, J. C.	Hunters Lodge, Wells	1	0	0
*Douglas Campbell, Gen., C.B.	Sketty Hall, Sketty, Glam.	2	0	0
*Douglas, J.	Hanham Road, Kingswood, near Bristol	2	0	0

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		£	s.	d.
Down, H. E.	Middle Farm, Dinder, Wells	1	0	0
Drummond, Col. F. D. W., C.B.E.	Cawdor Estate Office, Carmarthen	1	0	0
Drummond, Brig.-Gen. Sir H. W.	Board Room, L.&S.W.R., Waterloo Station, London	1	0	0
Duck, W. G.	Neadwood, Christon, near Exeter	1	1	0
Duckworth, Major A. C.	Orchardleigh Park, Frome	1	0	0
Dugdale, Major J. G.	The Abbey, Cirencester	1	0	0
Dugdale, Major W. M.	Llwyn, Llanfyllin	1	0	0
Duncan, R.	Rhoose, near Barry	1	0	0
Dunlop, I. M.	Avonhurst, Sneyd Park, Bristol	1	0	0
*Durand, Lady	Hill House, Bridstow, Ross-on-Wye	2	0	0
Eagle Range and Gas Stove Company (Ltd.)	Catherine St., Aston, Birmingham	1	0	0
*†Eastwood, J. E.	Wade Court, Havant		..	
Eaton, G. T.	Thurston Hall, Framfield, Sussex	1	0	0
Economic Fencing Company (Ltd.)	Billiter House, Billiter Street, London, E.C.3.	1	0	0
Ede, P. M.	Plurrenden, Bethersden, Ashford, Kent	1	0	0
Eden, R. H. H.	Heytesbury, Wilts	1	0	0
*Edge, S. F.	Gallops Homestead, Ditchling, Sussex	2	2	0
Edge S. F., Pig Farms (Ltd.), Pedigree Stock Farms	Coolham, Horsham, Sussex	1	0	0
†Edmondson, A.	Woodclose, Silverdale, Lancashire		..	
Edmunds, L.	Cholderton, Salisbury	1	0	0
Edwards, A. P.	Gog's House, Wedmore, Somerset	1	1	0
Edwards, C. L. Fry	The Court, Axbridge, Somerset	1	0	0
Edwards, E. W.	Pevnor House, Chesham, Berks.	1	0	0
Edwards, R. G.	Burrington Vicarage, Bristol	1	1	0
Edwards, W. H. G.	Butcombe Court, Wrington	1	0	0
*Edwards-Ker, Lieut.-Col. D. R., O.B.E., M.A.	Principal, Seale Hayne Agricultural College, Newton Abbot	2	0	0
Eldridge, Pope & Co.	Dorchester	1	0	0
Elliott, T. M.	Biddestone, Chippenham	1	1	0
Elton, B. A.	Clevedon Court, Somerset	1	0	0
Elwes, Lt.-Col. H. C., D.S.O., M.V.O.	Colesborne, Cheltenham	1	1	0
Elwes, P. F. C.	Somerton, Somerset	1	0	0
Emmet, Mrs. R.	Moreton Paddox, Moreton Morrell, Warwick	1	0	0
Errington, R.	Victoria Mills, Sunderland	1	0	0

Name	Residence	Sub-scriptions		
		£	s.	d.
Erskine, Lord, M.P.	Charlton, near Bristol	1	0	0
*Esplen, Sir John, Bart.	Hardres Court, Canterbury	2	0	0
Evans, E. W.	Crickleaze House, Chard	1	0	0
Evans, H. M. Glynn	Plasissa, Llangennech, Carmarthenshire	1	0	0
Evans, Mrs. D. M.	116, Bryn Road, Swansea	1	1	0
Evans, Miss P. D.	Iscoed, Ferryside, Carm.	1	1	0
Evans, Thomas	Berkeley Villa, St. James's Garden, Swansea	1	0	0
†Evan-Thomas, Commander A.	Caerwnon, Builth Wells, R.S.O.	..		
Evan-Thomas, Vice-Admiral Sir Hugh	Redlap House, Dartmouth	1	0	0
†Eve, Mr. Justice	Royal Courts of Justice, London, W.C.2.	..		
Evelyn, Mrs.	Wotton House, near Dorking	1	0	0
Everard, Mrs.	Ratcliffe Hall, Leicester	1	0	0
Everard, W. L.	Ratcliffe Hall, Leicester	1	0	0
Eyles, T. W.	Ashley Wood, Kingsdown, Box, Wilts	1	1	0
Ezra, E.	Lock, Partridge Green, Sussex	1	0	0
*†Falmouth, Viscount	Tregothnan, Truro	..		
Fane, Major N. H.	Boyton Manor, Codford, Wilts	1	0	0
†Farmer, S. W.	Little Bedwyn, Wilts	..		
†Farwell, Major E. W.	Hylton Estate Office, Kilmersdon, Bath	..		
Fastnut, (Ltd.)	Beehive Wharf, Brentford, Middlesex	1	1	0
Faudel-Phillips, Major H.	..	1	0	0
Feaver, A.	Coal, Cake and Corn Merchant, Evercreech	1	0	0
Fenton, A. D.	Maristow, Roborough, S. Devon	0	10	0
Fenwick, M.	Abbotswood, Stow-on-the-Wold	1	1	0
*Ferguson-Davie, Sir W.J., Bt.	Creedy Park, Crediton	2	0	0
Ferrand, G. F.	Clanville Lodge, Andover, Hants.	1	0	0
Fewtrell, O. J.	Estate Office, Wells	1	0	0
Finn, L. & G.	Westwood Court, Faversham, Kent	1	0	0
Fison, J. & Co.	Ipswich	1	0	0
*Fitzgerald, Lady	Buckland, Faringdon, Berks	2	0	0
Fitzwilliams, Col. E. C. L., C.M.G.	Brynteifi, Pentrecourt, Llandyssul	1	0	0
Flemming, Lt.-Col. Gordon	Winsley House, Bradford-on-Avon	1	1	0
Fletcher, Capt. A. M. T.	Margam Park, Port Talbot	1	0	0
Flower, A. A.	Crox Bottom Farm, Bishopsworth, Bristol	1	0	0
Flower, James	Chilmark, Salisbury	1	0	0

Name	Residence	Sub-scriptions		
		£	s.	d,
Flower, T.	Inns Court Farm, Bishopsworth, Bristol	1	0	0
*†Folkestone, Viscount	Longford Castle, Salisbury		..	
*†Forester, Capt. F. W.	Saxilbye Park, Melton Mowbray		..	
Forster, J. C.	Clatford Mills, Andover	1	0	0
Fortune, R.	Newhouse, Cranleigh, Surrey	1	0	0
†Fortesque, J. B.	Boconnoc, Lostwithiel, Cornwall		..	
Four Oaks Spraying Machine Co. (Ltd.)	Four Oaks Works, Sutton Coldfield	1	0	0
Fowler & de la Perrelle	Porter's Lane, Southampton	1	0	0
Fowler, J & Co. (Ltd.)	Leeds	1	0	0
Fox, Brothers & Co.	Wellington, Somerset	1	1	0
Fox, C. L.	Rumwell Hall, Taunton	1	0	0
Fox, Mrs. A.	Brislington House, near Bristol	1	0	0
†Fox, Robert	Grove Hill, Falmouth		..	
Fox, R. A.	Yate House, Yate, Glos.	1	1	0
Foxcroft, C. T.	Hinton Charterhouse, Bath	1	1	0
Francis, Major O. L.	Downton, Salisbury	1	1	0
*Fremlin, W. T.	Milgate Park, Maidstone	2	0	0
French, W. T. and Son	St. Mary Street, Ladywood, BirBingham	1	0	0
Frost, E. J.	Fountain Farm, Dulcote, Wells	1	0	0
Fry, A. M.	8, Zion Hill, Clifton, Bristol	1	1	0
Fry, Cecil	Grove House, Frenchay, Bristol	1	0	0
Fry, C. A. H.	Ashton Lodge, Long Ashton, Bristol	1	0	0
Fry, H. A.	Monmouth Place, Bath	1	1	0
*Fry, J. S. & Son (Ltd.)	Union Street, Bristol	2	2	0
†Fuller, G. Pargiter	Neston Park, Corsham		..	
*Fuller, Major R. F.	Great Chalfield, Melksham, Wilts	2	0	0
Fuller, Mrs. R. F.	Great Chalfield, Melksham, Wilts	1	0	0
Fuller, S & A.	Bath	1	0	0
Fullwood and Bland	31-35, Bevenden Street, Hoxton, London, N.	1	0	0
Fursdon, E. S.	The Elms, Alphington	1	1	0
Gale, G.	The Grove, Winterbourne, near Bristol	1	0	0
Galloway, J.	Sharcombe Park, Dinder, Wells, Somerset	1	1	0
Gane, P. J.	Higher Rocke Farm, Butleigh, Glastonbury	1	0	0
Gantlett, W. R. & Son	Manor Farm, Fairford, Glos.	1	1	0
Gardiner, Sons & Co.	Nelson Street, Bristol	1	1	0
Garne, W.	Aldsworth, Northleach	1	1	0
Garne, W. T.	Aldsworth, Northleach	1	1	0
Garrett, W.	Backwell Hill House, West Town, R.S.O., Somerset	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Garton, J. A.	Pylle Manor, Shepton Mallet, Somerset	1	0	0
Genge, M.	Stop Farm, Fonthill Gifford, Tisbury	1	1	0
Gibbins, T.	Glynfelin, Neath	1	0	0
†Gibbons, H.	The Model Farm, King's Langley, Herts.		..	
Gibbons, P. F., J.P.	Keynsham	1	1	0
†Gibbs, A. H.	Pytte, Clyst St. George, Topsham, Devon		..	
†Gibbs, Mrs.	Pytte, Clyst St. George, Topsham, Devon		..	
†Gibbs, Mrs. W. O.	Home Farm, Barrow Gurney		..	
*†Gibbs, Lt.-Col. G. A., M.P.	Tyntesfield, Bristol		..	
Gibbs, Lt.-Col. W. O.	Home Farm, Barrow Gurney	1	0	0
†Gibbs, H. M.	Barrow Court, Flax Bourton, Bristol		..	
Gibson, J. T.	Warren House, Wrington	1	1	0
Gifford, G.	Lyde Green, Pucklechurch, Bristol	1	1	0
Gill, F. C.	Westland, Farm, Challacombe, Devon	1	0	0
Gillingham, J. & Son	Prospect House, Chard	1	0	0
Gisborne, Col. L., C.M.G.	Lingen Hall, Brampton Bryan	1	0	0
†Gladstone, J.	Bowden Park, Chippenham		..	
Glanely, Lord	Lackham, Lacock, Wilts.	1	0	0
Glanville, F.	Poplar Farm, Westbury-sub-Mendip, Wells	1	0	0
Glencross, T.	The Paddocks, Stoke Gifford	1	1	0
Glover, J.	Cornwood, S. Devon	1	0	0
Glyn, Capt. Sir R. F., Bart.	The Cross House, Fontnell Magna, Shaftesbury	1	0	0
Godfrey, J. B.	Downside Farm, Shepton Mallet	1	0	0
†Godman, C. B.	Woldringfold, Horsham		..	
Godman, J.	The Raswells, Hascombe, Godalming	1	0	0
Godwin, Warren and Co., (Ltd.)	140, Redcliffe Street, Bristol	1	0	0
†Goldney, Sir Prior, Bart., C.B.	Derriads, Chippenham		..	
Goodchild, G. A.	The Oak House, Great Yeldham, Essex	1	1	0
Goodden, J. R. P.	Compton House, Sherborne	1	0	0
Goodman, A. & Sons	3, Hammett Street, Taunton, and Broad St. House, London, E.C.	1	0	0
*Gordon, Major R.G.S., M.C.	Langton House, Blandford	2	0	0
Gordon, G. H.	The Barn House, Sherborne	1	0	0
Goring, C.	Wiston Park, Steyning	1	0	0
†Gorringe, Hugh	Kingston-by-Sea, Brighton		..	

Name	Residence	Sub-scriptions £	s.	d.
Grace, A.	39, Welsh Back, Bristol	1	1	0
Graham-Clarke, Capt. J. E. H.	Frouston Manor, Stonehouse, Glos.	1	0	0
Grant-Ives, C. E.	Bradden House, Towcester, Northamptonshire	1	0	0
Grant, W. J.	42, Llanthewy Rd., Newport, Mon.	1	0	0
Gray, R.	The Estate Office, Sherborne	1	0	0
Greaves, R. M.	Wern, Portmadoc, North Wales	1	0	0
Green, A. W.	Stoke Abbey Farm, Stoke Bishop, Bristol	1	0	0
Green, E. A.	Cote Grange, Westbury-on-Trym, Bristol	1	0	0
†Green, Major H. L.	Fernside, West Derby		..	
†Greenall, Mrs. C. E.	The Manor, Carlton Scroop, Grantham		..	
†Greenall, Sir G., Bart.	Walton Hall, Warrington		..	
Greenway, W.	Halse, Taunton	1	0	0
Greenwell, Sir B., Bart.	Marden Park, Woldingham, Surrey	1	0	0
Greenwood, J. C.	Westfield Farm, Bloomfield Road, Bath	1	0	0
Gregory, W.	Wellington, Somerset	1	1	0
Grey, E. T.	Cowley Farm, Kingweston, Bristol	1	0	0
Griffin, A.	Springfield House, Worle, Weston-super-Mare	1	1	0
Griffin, L.	Manor Farm, Upton Cheyney, near Bristol	1	0	0
†Guest, Miss	Inwood, Templecombe		..	
†Guest, Lady Theodora	Inwood, Templecombe		..	
Guest, H. M.	Keynsham, Bristol	1	0	0
*Guilford, Earl of	Waldershare Park, Dover	2	0	0
Guille, H. C. de Stevens	Westleigh House, Westleigh, near Bideford, N. Devon	1	0	0
Gullick, W. F., F.R.H.S.	Waterloo Nursery, Salisbury	1	0	0
Gunther, C. E.	Tongswood, Hawkhurst, Kent	1	0	0
Habgood, G.	Harley Lodge, Wimborne	1	0	0
Hale, M. T.	Court Farm, Wookey, Wells	1	0	0
Hall, R. G.	Ferry House, Bere, Alston	1	0	0
*Hambleden, Viscount	Greenlands, Henley-on-Thames	5	0	0
*Hambro, Sir E. A., K.C.V.O.	Hayes Place, Kent	2	0	0
Hambro, H. C.	The Lodge, Tadworth, Surrey	1	0	0
Hamilton, Capt. C. E.	Weston, Newark-on-Trent	1	0	0
Hamilton, Capt. H. P	Breinton, Hereford	1	0	0
Hancock, H. C.	The Court, Milverton, Taunton	1	0	0
Hancock, Mrs. R. D.	Halse, Taunton	1	0	0
Handcock, J. T.	57, Queen Charlotte Street, Bristol	1	0	0
Harbottle, E. H.	Topsham, Devon	1	0	0
Harding, E.	Packwood Grange, Dorridge	1	0	0

Name	Residence	Sub-scriptions £	s.	d.
Harding, E. G.	Foxcote, Grittleton, Chippenham	1	0	0
Harditch, J. A.	Shipway Gate Farm, Portbury, Bristol	1	0	0
Hardwick, A.	Easton in Gordano, Bristol ..	1	0	0
Hardy, H. W.	Haycroft, Sherborne, Northleach	1	0	0
Hare, Lady K. F.	Brokenhurst Park, Hants ..	1	0	0
Harris, H.	Singleton Park Farm, Sketty, S.O., Glam.	1	0	0
Harris, J.	Wistland Road, Kentisbury, North Devon	1	0	0
Harris, J. M.	Chilvester Lodge, Calne, Wilts ..	1	0	0
Harrison, D.	The Grove, Tenby	1	0	0
Harrison, McGregor & Co. ..	Leigh, Lancashire	1	0	0
Harrop, Capt. W. M. ..	Gwersyllt Hill, Wrexham	1	0	0
Hart, W. H.	Home Farm, Biddestone, Chippenham	1	0	0
Hartley, Major H. B. ..	Tytherington, Heytesbury, Wilts.	1	0	0
Haward, T. W.	Margam, Port Talbot, South Wales	1	1	0
Hawker, Capt. H. G. ..	Strode, Ermington, Ivybridge ..	1	0	0
Hawkins, A. W. Bailey ..	Stagenhoe Park, Welwyn, Herts.	1	0	0
†Haydon, Lt.-Col. W. H. ..	Maidford, Malmesbury, Wilts ..	..		
Hayes-Sadler, Mrs. A. F. ..	44, Curzon Street, London, W.1 ..	1	0	0
Hayes, F. J.	West Pennard, Glastonbury ..	1	0	0
Heathcoat-Amory, Sir I. M., Bart.	Hensleigh, Tiverton, Devon ..	1	0	0
*†Henderson, Lieut.-Col. Hon. H. G...	Buscot Park, Faringdon, Berks ..	..		
Henderson, P. C. (Ld.) ..	West Bank Works, Barking, London	1	0	0
Heneage-Vivian, Rear Admiral Walter	Parc le Breos, Penmaen, Glam. ..	1	0	0
Henry, Lt.-Col. F.	Elmstree, Tetbury	1	0	0
Heppel, E. M.	Camerton, near Bath	1	1	0
Heseltine, Lt.-Col. J. E. N. ..	Hawking Down Farm, Hindon, Salisbury	1	0	0
Hesse, F. W.	Weston Hill, Weston Park, Bath	1	0	0
†Hewitt, G. Southby ..	Day, Son & Hewitt, 22, Dorset Street, London, W.1.	..		
Hick, W. A.	Wayfield, Batheaston, Bath ..	1	0	0
Hicks, R. S.	WilbrahamsFarm, GreatWilbrahams, Cambs.	1	1	0
Hicks-Beach, Lady Susan ..	Coln S. Aldwyn, Fairford, Glos. ..	1	0	0
Hickton, J. W.	Bellbroughton, Stourbridge ..	1	0	0
Higgins, B.	Millhouse Farm, Evercreech ..	0	10	0
Higgins, W. A.	11, York Street, Swansea	1	0	0
Hignett, G.	Hodshill, Southstoke, Bath ..	1	1	0
Hignett, Mrs. G.	Hodshill, Southstoke, Bath ..	1	1	0

Name	Residence	Sub-scriptions £	s.	d.
		£	s.	d.
†Hill, B. H.	Uphill, Weston-super-Mare	..		
Hill, H.	Paulton, near Bristol	1	1	0
Hill, C. L.	Harptree Court, East Harptree, near Bristol	1	0	0
Hill, H. N.	High Street, Newmarket	1	0	0
Hill, S.	Langford House, Churchill, Bristol	1	0	0
Hill, Major V. T.	Woodspring Priory, near Weston-super-Mare	1	1	0
†Hinckes, Captain R. T.	Mansel Court, Mansel Lacey, Hereford	..		
Hippisley & Sons	Wells, Somerset	1	0	0
Hippisley, R. J. B.	Ston Easton Park, Bath	1	0	0
Hiscock, Victor	France Farm, Blandford	1	1	0
†Hoare, Sir H. H. A., Bart.	Stourhead, Zeals, S.O., Wilts	..		
Hobhouse, A. L., M.P.	Hadspen House,CastleCary,Somt.	1	0	0
†Hobhouse, R. A.	Pondmead, Oakhill, Somerset	..		
*Hobhouse, Rt.-Hon. H.	Hadspen House, Castle Cary	2	0	0
†Hoddinott, S.	DeanVale,West Cranmore,Shepton Mallet	..		
Holford, Mrs. Gwynne	Buckland, Bwlch, Breconshire	1	0	0
Holland, J. H.	Peene House, Newington, Shorncliffe Camp, Kent	1	0	0
Holley, W. M.	60, Mark Lane, London, E.C.3.	1	0	0
Holmes, J. V.	Penyfai, Llanelly, Carmarthenshire	1	1	0
Holt Needham, O. N.	Barton Court, Colwall, nr. Malvern	1	0	0
†Holt Thomas G.	North Dean House, Hughendon, Bucks	..		
Hook, Brian	The Nook, Bloxham, Banbury	1	0	0
Hooley, Terah F.	Dry Drayton, Cambridge	1	0	0
Hooper, Bros.	Newburgh, Winfrith, Dorchester	1	0	0
†Horner, Sir. J. F. Fortescue	Mells Park, Frome	..		
Horton-Starkie, Rev. Preb. Le G. G.	Wellow Vicarage, Bath	1	1	0
Hosegood, A. W.	Williton, Taunton	1	0	0
Hosegood, Obed., jun.	Dillington, Ilminster	0	10	0
Hosking, W. L.	Fentongollan, Probus, Cornwall	1	0	0
House, V. J.	Walcombe, Wells	1	0	0
Howard, A. H. S.	Thornbury Castle, Gloucester	1	0	0
Howard, J. & F.	Bedford	1	0	0
Howard, Mrs.	New Copse, Medstead, Hants.	1	0	0
Howe, G.	Hunting Stables, Taunton	1	0	0
Huggett, O. W.	53, Corn Street, Bristol	1	1	0
†Hughes, A. E.	The Laurels, Bargates, Leominster	..		
Humphries, Sir Sidney, J.P.	Eastfield Lodge, Westbury-on-Trym, Bristol	1	1	0
Huntington, Major A. W.	Wellesbourne House, Warwick	1	0	0
†Hurle, J. C.	Kilve Court, Bridgwater	..		
Hurle, Major J. A. Cooke	Yarlington House, Wincanton	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Hurst & Son	152, Houndsditch, London, E.1	1	0	0
*Hussey, A. H.	Maincombe, Crewkerne	2	0	0
Hussey, T.	Manor Farm, Coxley, Wells	1	0	0
Hussey, Captain H.	Maincombe, Crewkerne	1	0	0
Hutton, K. M.	East Farm, Affpiddle, Dorchester	1	1	0
Huxtable, J. & Co.	Alexandra Works, Barnstaple	1	0	0
†Hylton, Lord	Charlton, near Radstock	..		
*Ilchester, Earl of	Melbury, Dorchester	2	2	0
Iles, D.	Lyegrove, Badminton	1	0	0
Imbert-Terry, Capt. F. B.	Blue Hayes, Broadclyst, Devon	1	0	0
Imbert-Terry, Mrs. L.	Blue Hayes, Broadclyst, Devon	1	0	0
Imperial Live Stock Insurance Co.	17, Pall Mall, East London, S.W.	1	0	0
International Harvester Co. (Ltd.)	80, Finsbury Pavement, London, E.C.	1	0	0
Ireland, A. C.	Brislington Hill, near Bristol	1	1	0
*Ismay, J. H.	Iwerne Minster, Blandford, Dorset	2	0	0
Jackman, Percy	Pulteney Hotel, Bath	1	0	0
Jackson, Sir Henry Mather	Llantillio Court, Abergavenny	1	0	0
James, Mark	Home Farm, Ston Easton, Bath	1	0	0
James, W.	10, Portland Street, Swansea	1	1	0
Jarmain, T. M.	Haseley Iron Works, Tetsworth	1	1	0
Jenkins, D.	Boverton Place, Llantwit Major, Glam.	1	0	0
Jenkins, E.	c/o F. Capern, Lewin's Mead, Bristol	1	0	0
Jenkins, T. E.	Kilvrough Home Farm, Park Mill, S.O., Glamorgan	1	0	0
Jenkins, Captain Vaughan	St. Winifreds, Combe Down, Bath	1	0	0
Jenkins, W. A.	Tuxeds, Eaton Grove, Swansea	1	0	0
Jenks, Shirley H.	Elmore, Thorncombe, near Bristol	1	1	0
†Jervoise, Mrs. B. A. L.	Herriard Park, Basingstoke	..		
Jervoise, F. H. T.	Herriard Park, Basingstoke	1	1	0
Jewell, Mrs. Eva	Henden Manor, Ide Hill, Sevenoaks, Kent	1	0	0
Jeyes' Sanitary Compounds Company	Cannon Street, London, E.C.4.	1	0	0
John, T. D.	The Hollies, Lisvane, Glam.	1	0	0
John, W. H.	High Street, Cowbridge, Glam.	1	0	0
John, W. Llewellyn	Penmount, Llanelly, Carm.	1	1	0
Johns, W. B.	Clinton Estate Office, Dolton, N. Devon	1	1	0
*Johnstone, F. E.	Small Hythe, Tenterden, Kent	2	0	0

Name	Residence	Sub-scriptions		
		£	s.	d.
Johnstone, G. H.	Trewithen, Grampound Road, Cornwall	1	0	0
Jones, A.	Bowcott Farm, Wotton-under-Edge, Glos.	0	10	0
Jones, E., J.P.	The Plas, Trimsaran, near Llanelly	1	0	0
Jones, E.	Penybont Farm, Sennybridge, Brecon	1	0	0
Jones, F. G.	Church Farm, Mitcheltroy, near Monmouth	1	0	0
†Jones, H. G.	Downford, Mayfield, Sussex		..	
Jones, K. S.	Norton Nouse, West Cross, Swansea	1	0	0
Jones, T. S.	Frondez, Radyr, Cardiff	1	0	0
Jones & Son	Tolbury Mills, Bruton	1	1	0
Joyce, Rev. W. W.	Charles Parsonage, South Molton	1	0	0
Kay-Mouat, Miss K.	The Firs Farm, Malvern Wells	1	0	0
*Kearse, A. A.	Manor Farm, Latton, Cricklade, Wilts	2	2	0
Keeling, G.	North Hill Farm, Dunkerton, Bath	1	0	0
Keen, T. R. W.	Crannell Farm, Polsham, Wells	1	0	0
Keen, R. L.	Furlong Farm, Westbury-sub-Mendip, Wells	1	0	0
Keen, R. T.	Furlong Farm, Westbury-sub-Mendip, Wells	1	0	0
Kekewich, Sir T. H., Bart.	Peamore, Exeter	1	0	0
Kell & Co.	Gloucester	1	0	0
Kelway, W.	Huish Episcopi, Langport	1	1	0
Kemble, Miss M. I.	Wraxall Manor, Dorchester	1	1	0
†Kemp, L. J.	Maer, Exmouth		..	
Kendall, W. G.	Yarner, Darlington, Totnes, S. Devon	1	0	0
Kennaway, Sir J., Bart.	Escot, Ottery St. Mary	1	0	0
Kenward, E.	Axford Lodge, near Basingstoke	1	0	0
Kenyon-Slaney, Major	Bridestow, Devon	1	0	0
*Keyser, C. E.	Aldermaston Court, Reading	2	0	0
Kidner, S., O.B.E.	Bickley, Milverton, near Taunton	1	0	0
Kidston, G.	Hazlebury, Box, Wilts	1	0	0
Killen, C. J.	Middle Farm, West Horrington, Wells	1	0	0
Killen, J. J.	Rood Farm, Butleigh, Glastonbury	1	0	0
Killen, R. H.	Manor Farm, Farrington Gurney, Bristol	1	0	0
King, Mrs. A. C.	Braishfield Pony Stud, Romsey, Hants	1	0	0
King, E. A.	Proudcross Farm, East Harptree, near Bristol	1	0	0

Name	Residence	Subscriptions		
		£	s.	d
King, E. W.	Chew Magna, near Bristol	1	0	0
King, T.	Lower Barnes, Wotton-under-Edge, Glos.	1	0	0
King & Sons, R.	Milsom Street, Bath	1	1	0
Kingwell, H. J.	Bow Grange, Totnes	1	0	0
Knight-Bruce, R.	The Sanctuary, Shobrooke, Crediton	1	0	0
Knight, S. J.	Buckingham Lodge, Keynsham, Bristol	1	0	0
Knight, R. W. R.	Compton Dando, near Bristol	1	0	0
†Knollys, C. R.	Weekley, Kettering		..	
Knox, E.	Richmond Grove, Bath	1	1	0
†Kruse, W.	St. Blazey, Par Station, Cornwall		..	
†Lake, C.	Glenthorne, Gravesend		..	
Lander, J.	Lydney Park, Gloucester	1	1	0
Lang-Coath, H.	Guildhall, Swansea	1	0	0
Langford, E. W. (Ld.)	Hereford	1	0	0
*Lansdowne, Marquis of	Bowood, Calne	2	0	0
†Latham, T.	The Limes, Westwood Road, Tilehurst, Reading		..	
Laurie, A. Dyson	Stone Street Farm, Sevenoaks	1	0	0
Lawes, Algernon (Ltd.)	203, Hornsey Road, London, N.7	1	1	0
Lawrence, Lt.-Col. the Hon. G.	Hill Farm, Oaksey, Wilts	1	0	0
Lawton, W.	Kindatt, Penn Lea Road, Bath	1	0	0
Laye, Captain R.	The Warren, Wotton-under-Edge, Glos.	1	0	0
Leeder, E. H.	Mount Pleasant House, Swansea	1	0	0
Leitrim, Earl of	Court Lodge Farm, Teston, Maidstone	1	1	0
Leverton, W. A.	Columb John Farm, Stoke Canon, Exeter	1	0	0
Lewis G. C.,	3, Temple Buildings, Goat Street, Swansea	1	1	0
Lewis, Miss E.	Ffrwdydrain, Llandilo	1	0	0
Lewis, Col. H.	Green Meadow, near Cardiff	1	1	0
Lewis, Wm. & Son (Ltd.)	*Herald* Office, Bath	1	0	0
Lewis, W.	Langstone Court, Newport, Mon.	1	0	0
†Ley, John Henry	Trehill, Exeter		..	
†Leyland, C. J.	Haggerston Castle, Beal, Northumberland		..	
Liddell, Capt. C. O.	Shire Newton Hall, Chepstow	1	1	0
Liddon, E., M.D.	Silver Street House, Taunton	1	0	0
Lipscomb, Godfrey	Claverton Lodge, Bathwick Hill, Bath	1	0	0
Lisburne, Earl of	Crosswood, Cards	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Lister, R. A. & Co. (Ltd.)	Dursley, Glos.	1	1	0
†Lister, J. J.	Falkland House, Lewes		..	
Llewellyn, Capt. Llewellyn T. E.	Hackwood, Basingstoke	1	0	0
Llewellyn, Griffiths R. P.	Combend, Elkstone, Colesborne, S.O.	1	0	0
*Llewelyn, Sir J. T. D., Bart.	Penllergaer, Swansea	2	2	0
*†Long, Rt. Hon. Viscount	Rood Ashton, Trowbridge		..	
Long, Col. William	Newton House, Clevedon, Somerset	1	0	0
Long, W. F.	Broadway House, Chilcompton, near Bath	1	0	0
Longrigg, G. E.	Weston Lea, Bath	1	0	0
Lopes, Sir H. Y. Buller, Bart.	Maristow, Roborough, Devon	1	0	0
Lord Wandsworth Agricultural College	Long Sutton, Winchfield, Hants	1	1	0
Loxton, A. H.	Croft Farm, Westbury-sub-Mendip, Wells	1	0	0
Lucas, A. T. S.	Manor Farm, Cold Ashton, Marshfield, Chippenham	1	0	0
Lucas, H. R.	Bonyalva, St. Germans, Cornwall	1	0	0
Luckes, S.	Bridge Street, Taunton	1	1	0
Ludlow, Lady	Luton Hoo, Luton	1	0	0
*Luff, J. Purnell	The Towers, Evercreech, Bath	2	2	0
Lupton, Miss A.	Chalmington, Dorchester	1	1	0
†Lupton, N. D.	Chalmington, Cattistock, Dorset		..	
Luscombe, B.	Bowden, Yealmpton, Devon	1	0	0
†Lutley, J. H.	Brockhampton, Worcester		..	
Luttrell, Major A. C.	Lea Combe House, Axminster	1	1	0
Luttrell, Capt. A. F.	Court House, East Quantoxhead, Bridgwater	1	0	0
Luttrell, Claude M. F.	Ben Mead, Box, Wilts	1	1	0
Macdonald, H. L. S.	Avondale, Bathford, Bath	1	0	0
Macey, H.	Penn Park, Westbury-on-Trym, Bristol	1	0	0
Macintosh, J.	The University College, Reading	1	0	0
Maddever, J.	Erth Barton, Saltash	1	1	0
Maitland, A.	Thornleigh, Vicars Cross, near Chester	1	1	0
Major, H. J. & C. (Ltd.)	Bridgwater	1	0	0
Malet, Col. Sir Harry	Wilbury, Newton Tony, Salisbury	1	0	0
†Mansell, A. E.	Mount Vernon, Melton Mowbray, Tasmania		..	
Mansfield, T.	Winterbourne Court, Winterbourne, Bristol	1	0	0
Mapstone, R. G.	Glastonbury	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Mardon, Lt.-Col. A. C.	Oakhayes,Woodbury,South Devon	0	1	0
Marfell, R. H.	Great HouseFarm,Llangeview,Usk	1	1	0
Marshall, H. C., C.C.	Wrington, Somerset	1	0	0
Marshall, J. I.	Park Farm, Bath	1	0	0
Marshall, L. H.	Chippenham	1	0	0
Marshall, Sons & Co. (Ltd.)	Brittania Iron Works, Gainsborough	1	0	0
Martin, Col.	Bishops Caundle, Sherborne	1	0	0
Martin, Mrs.	Bishops Caundle, Sherborne	1	0	0
Martin, J.	Thorverton, R.S.O., Devon	1	0	0
Martin, T. L.	Ashe Warren, near Basingstoke	1	0	0
Martin, W. P.	Colleton, near Chulmleigh	1	0	0
Martyn, G.	Tremeddan, Liskeard, Cornwall	1	1	0
Mason, F. F.	Swansea	1	0	0
Massey-Harris Co. (Ltd.), (G. W. Dawkins, General Manager)	54 & 55, Bunhill Row, London, E.C.1	1	0	0
Masters, A.	Kyneton, Thornbury, Glos.	1	0	0
Mathews, Ernest	Little Shardeloes, Amersham, Bucks	1	0	0
Matthews, H.	Winterbourne, Bristol	1	0	0
Maunder, J.	Kingweston, Somerton	1	0	0
Maunder, L. T.	Butleigh, Glastonbury	1	0	0
May, E. Howard, c/o May and Hassell (Ltd.)	Baltic Wharf, Bristol	1	0	0
Meaker, W.	Charlton Mackrell, Taunton	1	0	0
Meddick, William G.	Fairfield Arms, Fairfield Pk., Bath	1	0	0
Membery, R.	37, Southgate Street, Bath	1	0	0
Merry, Richard	Goulds, Broadclyst, Exeter	0	10	0
Merson, T. H.	Faringdon, N. Petherton, Bridgwater	1	0	0
*Methuen, General Lord, C.B., C.M.G.	Corsham Court, Wilts	2	0	0
*Methuen, Hon. Paul	Beanacre Manor, Melksham	2	0	0
Mildmay, Capt. C. B. St. J.	Hallam, Dulverton	1	0	0
*Mildmay, Lord	Flete, Ivybridge, S. Devon	2	2	0
†Mildred, G. B.	.. ..		..	
†Miles, Lieut.-Col. Sir Charles W., Bart	The Manor House Walton-in-Gordano, Clevedon		..	
Miles, H.	Auctioneer, Farrington Gurney, Bristol	1	0	0
Millard, A. A.	Pearash Farm, Penselwood, Bourton, Dorset	1	1	0
Millard, F. J.	Bridge Farm,Butleigh,Glastonbury	1	0	0
Miller-Hallett, A.	Goddington, Chelsfield, Kent	1	1	0

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		£	s.	d.
Mills, B. W.	31, Cambridge Place, Paddington, London, W.	1	0	0
Mitchell, Major F. A.	Doughton House, Tetbury, Glos.	1	0	0
Mogg, B. D.	Cherry Orchard Farm, Wells	1	0	0
Molassine Co. (Ltd.)	East Greenwich, London, S.E.	1	0	0
Mond, Sir Alfred	Melchet Court, Romsey	1	0	0
Moody, C.	Maisemoor, Evercreech	1	0	0
Moody, G. W.	Stapleton, Martock, Somerset	1	0	0
Moore, G.	Folly Farm Polsham, Wells	1	0	0
†Moore, H. F.	Renée House, 48, Dulwich Road, Herne Hill, S.E.24		..	
Moore, M. H.	The Hellyers, Ipplepen, Newton Abbot	1	1	0
Moore-Gwyn, Major J. G.	Longford Court, Neath, Glam.	1	0	0
†Moore-Stevens, J. R. C.	Woodhayes, Whimple, Devon		..	
Moore-Stevens, Col. R. A.	Woodhayes, Whimple, Devon	1	0	0
Morel, C. E.	..	1	0	0
Morgan, L. H. G.	Woolcombe, Wellington, Somerset	1	0	0
Morland, J. C.	The Orchard, Street, Somerset	1	0	0
*Morley, Earl of	Saltram, Plympton, Devon	2	0	0
*Morris, C.	Highfield Hall, St. Albans	2	0	0
Morris, C.	East Lydeard Farm, Bishop's Lydeard, Taunton	1	0	0
Morris, Capt. T. R.	Sketty Park, Sketty, R.S.O., Glam	1	0	0
Morris and Griffin (Ltd.)	Maindee, Newport, Mon.	1	1	0
Morris, Sir R. A. Bart.	Sketty Park, Swansea	1	0	0
Morris, Son and Peard	Auctioneers, North Curry, Taunton	1	0	0
Morrison-Bell, Col. E. F.	The Close, Tetbury, Glos.	1	0	0
*†Morrison, Hugh, M.P.	Fonthill House, Tisbury, Wilts		..	
Morrison, Major J. A., D.S.O.	Berwick House, Hindon, Salisbury	1	0	0
†Morrison, J. A.	Basildon Park, Reading		..	
Mortimer, Capt. A. E.	Wall's Court, Stoke Gifford, near Bristol	1	0	0
Mortimer, Major M. W.	Longleat Estate Office, Warminster	1	1	0
Mount-Edgcumbe, Earl of	Mount Edgcumbe, Devonport	1	1	0
*Munn, F. S.	Dumballs Road, Cardiff	2	0	0
Muntz, Mrs. J. O.	Foxhams, Horrabridge, S. Devon	1	1	0
Murch, J.	Charlton Mackrell	1	0	0
Murray Smith, Hon. Mrs.	Gumley Hall, Market Harborough	1	0	0
Napier, H. B.	Ashton Court Estate Office, Long Ashton, Bristol	1	1	0
Napier, Capt. W. E.	Upton House, nr. Sandwich, Kent	1	0	0
Neagle, D. T.	London, Gloucester and N. Hants Co. (Ltd.), 25, Whatley Road, Clifton, Bristol	1	0	0
Neal, Mrs. G.	Kingsdon, Taunton	1	1	0

Name	Residence	Sub-scriptions		
		£	s.	d.
Neal, W. H.	Yealmpstone Farm, Plympton	1	0	0
Neale, Hastings	Berkeley, Glos.	1	0	0
Neeld, Sir A. D., Bart., C.B.	Grittleton, Chippenham	1	0	0
Nelder, C. W.	Carnarvon Arms, Dulverton, Somerset	0	10	0
†Neville, Lieut.-Commander Ralph, R.N.	Butleigh, Glastonbury		..	
†Neville-Grenville, Robert	Butleigh Court, Glastonbury		..	
New, H. G.	Craddock, Cullompton, Devon	1	0	0
Newall, R. S.	Fisherton de la Mere, Wyle, Wilts	1	1	0
Newington, C.	Oakover, Ticehurst, Sussex	1	0	0
Newman, Sir R. H. S., Bart., D.L., M.P.	Mamhead Park, near Exeter	1	1	0
Nicholetts, E. C.	The Lons, Bitton, Gloucestershire	1	0	0
Nichols, G.	Demarara House, Colston Avenue, Bristol	1	0	0
Nicholson, R. F.	Woodcott, Whitchurch, Hants	1	0	0
Nicholls, A. W.	Lorna Doone Rustic Works, Barnstaple	1	0	0
Nix, J. A.	Tilgate, Crawley, Sussex	1	1	0
Nixon, W.	The Cottage, Offchurch, Leamington	1	0	0
*Normanton, Earl of	Somerley, Ringwood	2	0	0
Northey, G., J.P.	Cheney Court, Box, Wilts	1	0	0
*Northumberland, Duke of	Albury Park, Guildford	2	0	0
Nurse, F. G.	Wick Farm, Coxley, Wells	1	0	0
Nuthall, S.	Runtley Farm, Sutton Green, nr. Guildford	1	0	0
Nutt, Mrs. H. J.	Hampton House, Hampton-in-Arden, Warwick	1	0	0
Oakes, Mrs. W.	Graslawn House, Exeter	1	1	0
†O'Hagan, Lord	Pyrgo Park, Havering Atte Bower, Romford, Essex		..	
O'Halloran, Miss P.	Fairwood Lodge, Killay, Glam.	1	0	0
Orde Powlett, Hon. N. A.	Bolton Hall, Leyburn, Yorks.	1	0	0
*†Oppenheimer, Sir B., Bart.	Sefton Park, Stoke Poges, Bucks.		..	
Osmond and Son	Grimsby	1	0	0
Paddison, W. P.	Research Department, Royal Arsenal, Woolwich, London, S.E.18	1	0	0
Paget, L. C.	Middlethorpe Hall, Yorks	1	0	0
*Paget, Sir Richard, Bart.	74, Strand, London, S.W.1	2	0	0
†Palmer, R.	Lodge Farm, Nazeing, Waltham Cross, Essex		..	

Name	Residence	Sub-scriptions		
		£	s.	d.
Palmer, W. H.	York Buildings, Bridgwater	1	0	0
Palmer, Mrs. W. Howard	Heathlands, Wokingham, Berks	1	0	0
†Parker, Hon. Cecil T.	The Grove, Corsham, Wilts		..	
*†Parker, F. J.	Plymouth Street, Swansea		..	
Parmiter, P. J. & Sons	Tisbury, Wilts	1	0	0
*Parry, J. E.	Talybryn, Bwlch, S.O., Breconshire	2	0	0
Parry, J. M. and Co.	Leominster, Hereford	1	0	0
Parry-Okeden, Lieut.-Col U. E. P.	Turnworth, Blanford	1	0	0
†Parsons, J. D. Toogood	Grasmere, East Hoathley, Sussex		..	
†Parsons, R. M. P.	Misterton, Crewkerne		..	
Parsons, F. W.	Speckington, Ilchester	1	0	0
Parsons, J.	The Lons, Portishead	1	0	0
Partridge, A. A.	Mordref, Plympton, Devon	1	0	0
Pass, Captain A. D.	Manor House, Wootton Fitzpaine, Charmouth, Dorset	1	0	0
Patey, Rev. C. R.	Stowford House, Ivybridge	1	1	0
Pawlyn, J. H. W.	Messrs. Ransomes, Sims & Jefferies (Ltd.), Orwell Works, Ipswich	1	0	0
Peacock, W.	3, Buckingham Gate, London	1	1	0
Pearce, C. E.	Sea Mills Farm, near Bristol	1	0	0
Pearce, E.	Parsonage Farm, Long Ashton, Bristol	1	0	0
Pearce, J.	Parsonage Farm, Long Ashton, Bristol	1	0	0
Pearce, T. H.	Parsonage Farm, Long Ashton, Bristol	1	0	0
Pearson, Major the Hon. Harold	Cowdray Park, Midhurst, Sussex	1	0	0
Peel, Major E. Morton	St. Leonards, Langland, Swansea	1	0	0
Peel, Viscount	52, Grosvenor Street, London, W.	1	1	0
Penberthy, Professor J.	Dean Hall, Newnham Glos.	1	0	0
*Pender, Major H. Denison, D.S.O.	Strangways, Marnhull, Dorset	2	0	0
Pendarves, W. Cole	Pendarves, Camborne, Cornwall	1	1	0
Penson, F.	Taston, Charlbury, Oxon.	1	0	0
Pepper, W. F.	New Redlynch Farm, Bruton	1	0	0
Perfect Patents Company	195, High Street, Brentford, Middlesex	1	0	0
Perkins, Col. E. K., M.P.	31, Wenn Road, Southampton	1	1	0
Perkins, F. H. S.	Wye Croft, Monmouth	1	0	0
Petherick, R., jun.	Acland Barton, Landkey, Barnstaple	0	10	0
Petters (Ltd.)	Yeovil	1	0	0
Pettifer, T. & Co.	Eydon, Banbury	1	0	0
Peyton, E. P.	Woodcote Lodge, Kenilworth	1	0	0

Name	Residence	Subscriptions £	s.	d.
Phillips, F.	Nantcoch, Newport, Mon. ..	1	1	0
Phillips, Sir L. R.	.. ..	1	1	0
Phipps, C. B. H.	Chalcot, Westbury, Wilts ..	1	0	0
Phipps, Hornby, Capt. ..	Somerton, Somerset	1	0	0
Pierce, E. T.	West Wood Farm, Filton, Glos. ..	1	0	0
Piggott, Brothers & Co. ..	220, 222, 224, Bishopsgate Street, Without, London, E.C. ..	1	0	0
Pike, C. A.	Chilean Nitrate Committee, Friar's House, 39-41, New Broad Street, London, E.C.2	1	0	0
Pinkstone, C. G. (Pinkstone (Ld.)..	24, Church St., Temple, Bristol ..	1	0	0
†Pinney, R. W. P.	Somerton, Somerset	..		
Pitt, W.	The Albynes, Bridgnorth.. ..	1	0	0
Playle, A.	Bassingbourne, Royston, Herts ..	1	0	0
Plumptre, H. F.	Goodnestone, Dover	1	0	0
*Plymouth, Earl of	Hewell Grange, Bromsgrove ..	4	0	0
*Poltimore, Lord	Court Hall, North Molton, Devon	2	2	6
Pool, D. and F.	Down Barns Farm, West End, Northolt, Uxbridge	1	0	0
Poole, Mrs. A. R.	King's Hill, Dursley	1	1	0
Poore, Capt. J.	Estate Office, Badminton, Glos...	1	0	0
Pope, Alfred	Dorchester	1	0	0
Pope, A.	Henstill, Sanford, Crediton ..	1	0	0
Pope, John	Nowers, Wellington, Somerset ..	1	0	0
Popert, Capt. A. H... ..	Forestry School, Parkend, Glos...	1	0	0
Popham, H. L.	Hunstrete House, Pensford, Bristol	1	0	0
Portal, Maurice R.	Holywell, Swanmore, Hants ..	1	0	0
Porter, W. J. H.	Glendale Farm, Wedmore ..	1	0	0
†Portman, Viscount	Buxted Park, Uckfield, Sussex ..	..		
Portman, Vicountess.. ..	Buxted Park, Uckfield, Sussex ..	1	0	0
Portsmouth, Earl of.. ..	Barton House, Morchard Bishop, Devon	1	0	0
Powell, G. E...	5, Henley Grove, Westbury-on-Trym, Bristol	1	0	0
Powell, Mrs. G. E.	5, Henley Grove, Westbury-on-Trym, Bristol	1	0	0
Powell, G. F.	10, Beaufort West, Bath	1	0	0
Preston-Jones, A.	Mickleover House, near Derby ..	1	0	0
Preston-Jones, J.	Rushbury, Winchcombe	1	1	0
Price, J. H.	Higher Hill Farm, Butleigh, Glastonbury	1	0	0
Price, Owen	Nantyrharn, Cray, Brecon ..	1	0	0
Price, W. S.	Nantymadog, Cray, Brecon ..	1	0	0
Prichard, H. L.	Penmaen, R.S.O., Glam... ..	1	0	0
Pritchard, W. A.	Brentmoor, Brent, South Devon	1	0	0
Proctor, H. & T. (Ltd.) ..	Cathay, Bristol	1	1	0

Name	Residence	Subscriptions £	s.	d.
Proudfoot, W.	Woodbourne House, Shepton Mallet	1	0	0
Pullen, J. W.	Compton Greenfield, Bristol	1	0	0
†Purgold, A. D.	.. ..	..		
Pursey, C. E.	Bailey's Court, Stoke Gifford, near Bristol	1	0	0
Pursey, J. H. R.	Belle Vue, Filton, near Bristol	1	0	0
Pyke, C. C.	Capel Leyse, Holmwood, Surrey	1	1	0
Pyke Nott, E. G. I.	Haines Hill, Taunton	1	0	0
*Pyman, Sydney	Pigeon House, Ross-on-Wye	2	2	0
Quantock Vale Cider Co.	North Petherton, Bridgwater	1	0	0
Quested, J. E.	Cheriton, Kent	1	0	0
Quicke, Capt. L.A.	Newton House, Newton St. Cyres	1	0	0
Quilter, Sir Cuthbert, Bart.	Bawdsay Manor, Woodbridge	1	0	0
Radcliffe, Wynham Ivor	Druidstone, near Cardiff	1	0	0
*†Radnor, Earl of	Longford Castle, Salisbury	..		
Rawlence, Ernest A.	St. Andrew's, Salisbury	1	0	0
Rawlence, G. Norman	Salisbury	1	0	0
†Rawlence, Major M., D.S.O., R.E.	c/o Lloyd's Bank, Cox's Branch, 16, Charing Cross London, S.W.1.	..		
Rea, F. H.	Kite's Nest Farm, near Wotton-under-Edge, Glos.	1	0	0
Rees-Stokes, C. W.	Warwick House, Tenby	1	0	0
Reeves, Robert and John, and Son	Bratton Iron Works, Westbury, Wilts	1	0	0
Rennie, J. H.	Porthycarne, Usk, Mon.	1	0	0
Reynolds, Sylvanus	Corndean Hall, Winchcombe, Glos.	1	0	0
Richardson, Capt. A.	Seven Springs, Cheltenham	1	0	0
Richardson, Rev. A.	Bath and County Club, Bath	1	0	0
Ridge, Capt. R. T.	The Manor Farm, Brockley, West Town, near Bristol	1	0	0
Riley, J. L. & A.	The Iwerne, near Ledbury	1	0	0
Roberts, C. M.	9a, York Street, Bath	1	0	0
Robins, O. T. and A. F.	Lidcott Hall, High Bray, South Molton	1	0	0
Robinson, E. S. & A. (Ltd.)	Redcliffe Street, Bristol	1	1	0
Robinson, John & Co.	Bristol	1	1	0
Rogerson, R. W. (Ward & Co., Seedsmen)	Northgate Street, Bath	1	0	0
Rolleston, S. V.	.. ..	1	0	0
Rooksby, A.	Litchard Hall, Bridgend	1	0	0

Name	Residence	Subscriptions		
		£	s.	d.
Roundway, Lord	Roundway Park, Devizes	1	1	0
Rouse-Boughton, Sir W. St. A., Bart.	Downton Hall, Ludlow	1	0	0
Rouse-Boughton, Lady	Downton Hall, Ludlow	1	0	0
Rowcliffe, E. L.	Stovolds Hill, Cranleigh, Surrey	1	1	0
Rowcliffe, E. H. L.	Stovolds Hill, Cranleigh, Surrey	1	0	0
Rowcliffe, H. S.	13, Fernshaw Road, Chelsea, London, S.W.10	1	0	0
Rowett, J. Q.	Ely Place Estate Office, Frant, Sussex	1	0	0
Rowland, P. S.	The Laurels, Llangenneth, Reynoldston, S.O., Glam.	1	0	0
Royal Guernsey Agricultural and Horticultural Society	Guernsey	1	0	0
Rubeck, O. P.	"Valencia," Meath Green, Horley, Surrey	1	1	0
Rudd, Mrs.	Felbridge Park Farm, East Grinstead, Sussex	1	0	0
Russell, G.	North Hill Farm, Dundry, near Bristol	1	0	0
Russell-Smith, A.	North Houghton Manor, Stockbridge, Hants	1	0	0
Ruston & Hornsby (Ltd.)	Grantham	1	0	0
Rutherford, J. A.	Highclere Estate Office, Newbury, Berks	1	0	0
Ryan, E. M., International Harvester Co.	80, Finsbury Pavement, London, E.C.2.	1	0	0
†St. Audries, Lord	St. Audries, Bridgwater		..	
†Salmon, H. C.	North Field, Bridgwater		..	
Salter, Benjamin	Newlands, Broadclyst, Exeter	1	0	0
Salter, T.	Beare Farm, Broadclyst, Exeter	1	0	0
Samels, J. W.	Perfect Dairy Machines (Ltd.), 105, Middle Abbey Street, Dublin	1	0	0
Samuelson, Ernest	Bodicote Grange, Banbury	1	1	0
Sanders, Right Hon. Lt.-Col. Sir R. A. Bart.	Bayford Lodge, Wincanton	1	0	0
Sankey, R. I.	South Hill, Hastingleigh, Ashford, Kent	1	0	0
Saunders and Biss	172, Sidwell Street, Exeter	1	0	0
Sawtell, G. H.	Kingweston, Taunton	1	0	0
Sayers, Messrs.	Groundwell Manor, Blunsdon, Swindon	1	0	0
Scott, L. I.	Somerleaze, Wells	1	0	0
†Scott, C. T.	..		..	

Name	Residence	Subscriptions		
		£	s.	d.
Scutt, F. G.	218, Cheltenham Road, Bristol	1	1	0
†Seaton, Lord	Buckland Abbey, Yelverton, Devon		..	
Senior and Godwin	Auctioneers, Sturminster Newton, Dorset	1	1	0
Shaw, Col. F. S. Kennedy C.B.E.	Teffont Magna, Salisbury	1	1	0
†Shaw-Stewart, Walter R.	Hayes, Shaftesbury		..	
Sheldon, R. F.	West Street House, Wells	1	0	0
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BREEDERS' DIRECTORY.

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LADY WENTWORTH. Crabbet Arabian Stud Champion Arabs, best in the world; also White Mountain Pony Stud Welsh Champions. Inspection invited. Crabbet Park, Poundhill, Three Bridges, Sussex.

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CATTLE.

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CATTLE—*continued.*

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CATTLE - *continued.*

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BREEDERS' DIRECTORY.

SHEEP—*continued.*

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